20030305157

AD-A285 505

CUMENTATION PAGE

Form Approved
OMB No. 0704-0188

2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
12/23/75	

4. TITLE AND SUBTITLE
ANALYSIS OF EXPLORATORY DRILLING DATA, ROCKY MOUNTAIN ARSENAL

5. FUNDING NUMBERS

6. AUTHOR(S)
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
ROCKY MOUNTAIN ARSENAL (CO.)
COMMERCE CITY, CO

8. PERFORMING ORGANIZATION REPORT NUMBER
81266R34

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

AN EXPLORATORY DRILLING PROGRAM WAS INITATED AT RMA TO GATHER SPECIFIC INFORMATION ON THE SUBSURFACE SYSTEM. 54 BORE HOLES WERE DRILLED ALONG SECTIONS SHOWN ON ENCLOSURE #1. THE LOGS FORM THESE BORE HOLES SHOW THE NATURE OF THE SEDIMENT MAKING UP THE GROUND WATER TABLE AQUIFER, THE DEPTH TO GROUND WATER, AND THE DEPTH TO BEDROCK. SUBSURFACE CROSS-SECTIONS WERE CONSTRUCTED FROM THESE LOGS.

94-32332

14. SUBJECT TERMS	15. NUMBER OF PAGES
GROUNDWATER, CONTAMINATION, BEDROCK CONDITIONS, AQUIFER SEDIMENT CONDITIONS, ANALYSIS	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED			

AMCPM-DR-T

23 December 1975

MEMORANDUM FOR RECORD

SUBJECT: Analysis of Exploratory Drilling Data, RMA

1. An exploratory drilling program was initiated at RMA to gather specific information on the subsurface system. Fifty-four bore holes were drilled along the sections shown on the attached map (Incl 1). The logs from these bore holes (Incl 2) show the nature of the sediment making up the ground water table aquifer, the depth to ground water, and the depth to bedrock. Subsurface cross-sections were constructed from these logs (Incl 3).

2. Bedrock Conditions

The drilling logs show that the bedrock is generally composed of clay/claystone with some sand/sandstone. In bore holes 17, 18, 19, and 20 a notable quantity of sandstone was found in the bedrock. In bore holes 17, 18, and 19 the sandstone formed the top of the bedrock, in bore hole 20 the sandstone was covered by a weathered claystone. In all cases this bedrock sandstone did contain ground water. Sufficient drilling information is not available to determine the extent of this bedrock unit. These data do indicate that it is possible for a bedrock sand unit to be hydraulically linked to the water table aquifer. If such a bedrock sandstone were extensive enough it could act as a confined aquifer obtaining its recharge from the ground water table aquifer. When the comprehensive drilling program is undertaken, detailed logs should be kept on the bedrock to determine the presence and extent of permeable sandstone units.

3. Aquifer Sediment Conditions

a. The sediment above the bedrock was a clayey silty sand. At times some lenses of clean sand were encountered but these units were not extensive. Wells drilled into this type of sediment do not yeild sufficient quantities of water for pumping. Also, this type of sediment has a radius of pump well influence of only 5 to 10 meters (Jumikus, 1962). If conventional pump wells were installed the maximum spacing would be 5 to 10 meters unless specific aquifer test data indicated otherwise. Thus, with the data currently available, a conventional well system would not be considered adequate to control ground water flow.

b. A pumping trench will be required if ground water flow is to be controlled. This trench should be dug across the aquifer section. The trench would be backfilled with large gravel around perforated pipe. The perforated pipe would drain to a collection point or points where the water would be pumped for containment/treatment. The placement of such a pumping trench is dependent upon ground water movement and the concentration of suspected contaminants in the system. The depth of the trench is dependent upon the depth of contamination in the system.

4. Subsurface Cross Section Analysis

a. An analysis of cross sections O-O', P-P', and Q-Q' taken across the bedrock draw south of Basin C show that the bedrock channel narrows and becomes more "V" shaped to the south (X-Sec Q-Q'). The saturated portion of the sediment is more to the southwest (left side of X-Sections) than indicated by the USGS map data (Konikow, 1975). These data indicate that ground water flow coming from the Basin A area tends to flow more toward the west and northwest, even more so than indicated on the USGS ground water contour map. If such a volume of ground water is moving to the northwest, then the quantity of flow to the northeast from the Basin F area may be smaller than expected. If this flow is not small then some other flow conditions may be sustaining flow. Currently, not enough detail information is available to assess these flow conditions. These conditions should be noted and further evaluated as more data becomes available.

b. Another notable feature is shown on X-Sections P-P' and Q-Q'. Bore holes 7 and 16 were drilled immediately northwest and southeast of Basin B. The ground water table in these holes shows the capillary rise associated with Basin B. Water stands in Basin B even after long dry periods. This is a surface expression of ground water. Basin B water is also augmented by surface run-off water principally from the Basin A area, along the ditching between these basins.

c. Bore hole 12, X-Section Q-Q' shows a depressed ground water condition. This depression in the ground water table is probably due to increased permeability in this part of the aquifer. The drilling log for bore hole 12 also shows a higher sand content with less fines indicating a higher permeability. This again indicates more flow on the southwest side of the aquifer channel.

d. X-Section R-R' was drilled southeast of Basin A. The complete section has been broken into sub-sections as marked on Inclosure 1. X-Section R-RT_1 shows the ground water table to the southwest side of the section. This portion of the section is close to Upper Derby Lake and indicates that infiltration from the lake may be providing a good portion of the ground water

recharge in this area. From USGS model work, Phase I, the recharge attributed to the lakes and industrial activities was determined to be 55 GPM. To further define this flow quantity, ground water level changes in this area should be compared to lake level changes. If Upper Derby Lake is the principal recharge source for ground water under Basin A, the level of this lake should be kept low to reduce the flow of ground water under Basin A.

e. No water was noted in the remainder of X-Section R-RT_1, nor in X-Section RT_1 -RT_2. X-Section RT_2-R' contained water in bore hole 39 with indications of some water in bore hole 40. These bore holes correspond to the lowest section of the bedrock high northeast of Basin A. Map data and Konikow's chloride model work (Incl 4) indicates that this part of the bedrock high could be flooded by ground water from under Basin A. The presence of water in these borings indicates that flooding has or is occurring. Verification of this overflow can be obtained by drilling a bore hole 500 feet northeast of bore hole #39 (Incl 4). If overflowing of this bedrock high is still occurring, a sample of ground water from the verification bore hole should be taken for analysis. This analysis will determine if any of the contaminants suspected in the Basin A area are moving into the First Creek drainage system at this point.

f. Cross-Section S-S' was taken along the north boundary of the Arsenal. This section shows a depression in the bedrock surface under the bog, as well as under the existing First Creek channel. If contaminants are stratified in the ground water system, depressions such as these could provide undetected conduits for movement of contaminants. A lysimeter system should be placed near the location of bore hole 50, south of the bog. Lysimeters should be located at the bottom of the aquifer, the middle, and near the top. Analysis of these samples will show contaminant movement at all depths.

g. West of the bog the bedrock surface forms a mound with bore hole #47 at the apex. Comparison of the water monitor plan DIMP map to this portion of the cross section shows that the highest concentration of DIMP coincides with the bedrock mound. This could be an indication of stratification. Also, the ground water contours (Konikow, 1975) are more closely spaced in this part of the section, indicating a higher velocity of flow (assuming constant transmissibility), than in the eastern part of the cross section. A lysimeter has been proposed for placement near bore hole 47. If this system was placed near the location of bore hole 45, the increased velocity effect as well as stratification could be evaluated.

h. Besides the above data these cross sections show the bedrock configuration with sufficient accuracy to establish cost estimates for barriers placed

at these sections. These cross sections can also be used to compute section areas, ground water velocity, and ground water discharge rates.

5. Conclusions

a. All drilling done at RMA should be accurately logged, especially the bedrock conditions. This logging is being done for the SGO drilling program and should be continued when the comprehensive drilling work is done.

b. Data bearing on ground water flow conditions under Basins C, D, E, and F should be assembled and correlated to more accurately determine how the ground water flow from Basin A distributes to the north. These data include the depth to ground water each time a water sample is taken for analysis, the physical conditions of each monitor well (i.e., depth of well, casing depth, well screen length and depth, etc), and the water monitor plan results. These data are in the process of being gathered. Computer simulations of flow is being done by USGS and this data, intergated with the chemical data, will be useful. Also accurate logging for depth to water and depth to bedrock during the comprehensive drilling program should be done, especially in the Basins area.

c. The monitoring of ground water levels from the sampling wells as well as other wells north of Upper Derby Lake should be done. At the same time the level of Upper Derby Lake should be monitored. Correlation of these data would indicate how much the ground water system under Basin A is being recharged by Upper Derby Lake.

d. A verification hole should be drilled 500 feet northeast of bore hole 39 (Incl 1) to determine if ground water is breeching the bedrock high. This hole should be drilled during a period of high ground water. If water is found it should be analyzed under the existing water monitoring plan.

e. Position two lysimeter sampling systems along the north boundary, one system near the location of bore hole 50 immediately south of the bog, and one near the location of bore hole 45 (Incl 1). Three lysimeters should be placed at each point, one near the bottom of the aquifer, one in the middle, and one at the top. Samples from these lysimeters should be analyzed under the existing water monitoring plan. These lysimeter sampling points are currently being considered in conjunction with other sampling points in the RMA off post contamination plan revision.

4 Incl
as

JOSEPH R. KOLMER
CPT, MSC
Technical Support Division

REFERENCES CITED

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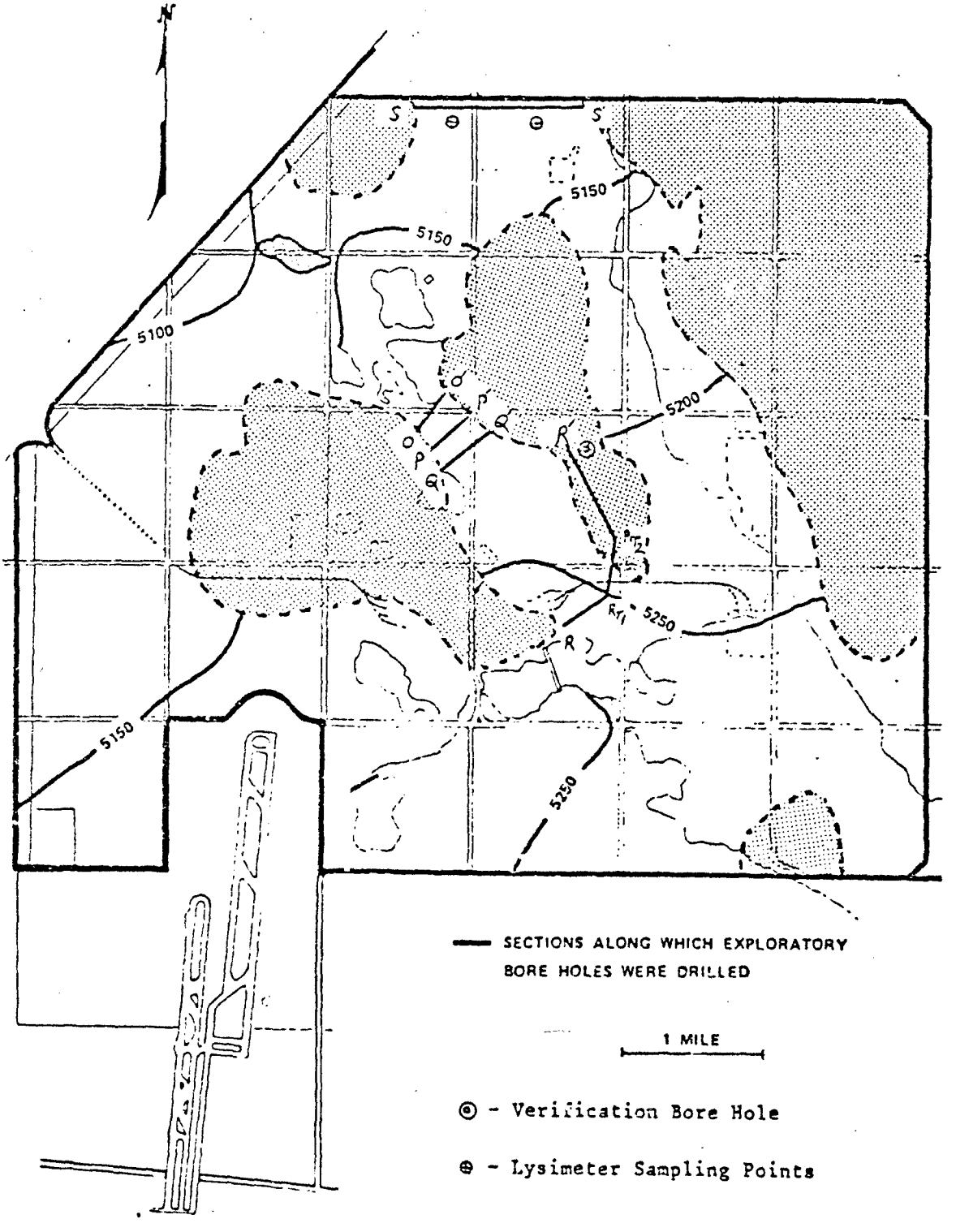
2. Konikow, L.F., 1975, Hydrogeological Maps of the Alluvial Aquifer in and Adjacent to the Rocky Mountain Arsenal, Colorado, US Geological Survey, Open-File Report 74-342.

3. Konikow, L.F., 1975, Modeling Solute Transport In Ground Water, presented at the International Conference on Environmental Sensing and Assessment, 14 September 1975.



EXPLORATORY BORE LOCATION PLAN

Sheet 1

KZ-1

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 11967 Proj. Name [illegible] Date 10-27-75

Hole No. 1 Hole Elev. 5211± est Hole Depth 27.0

Hole Type P/H Sample Types N/S — 1⅜ I.D.

Depth to Bedrock 22.6 Depth to W.T. ~~NE~~ Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	~0.1		(1)
0.1	7.0	SC	(7) moist - slightly clayey - silty
7.0	22.6	CL	(6) wet - V. sandy - V. silty
			sand @ 12.6 to 22.6
22.6	25.0	CH	(10) V. moist
25.0	27.0	CH	(10)
			H @ 2.0
			H @ 12.6
			H @ 22.6
			H @ 25.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 4967 Proj. Name [illegible] Date 10-25-75

le No. 2 Hole Elev. [illegible] Hole Depth 20.0

Hole Type P/A Sample Types P/S - Log Hole

Depth to Bedrock 16.6 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation [illegible]

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.5		(1)
0.5	2.0	CL	(6) Moist - Sandy - Silty
2.0	4.6	SC	(5) Moist - Clayey
4.6	16.6	CL	(12) V. moist to wet - Sandy - Silty
16.6	19.0	CH	(13)
19.0	20.0	CH	(11)
			H @ 20
			S @ 4.6
			H @ 16.6
			L @ 19.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d. Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 11967 Proj. Name N[illegible] EQUALIZER Date 11-27-75

Hole No. 3 Hole Elev. 5211 Est Hole Depth 23.0

Hole Type P/A Sample Types A/S — Auger Cuttings

Depth to Bedrock 21.0 Depth to W.T. — Field Eng. [illegible]

Ground Water Observation —

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	19.0	CL	(2) Mod. moist — SANDY
			V. Clay + V. Sandy @ 2.0 to 4
			Sandy + moist @ 4.6
			V. moist @ 6.0
19.0	20.6	CH	(10)
20.6	23.0	CL	(11)
			H @ 2.0
			H @ 6.6
			H @ 11.0
			H @ 19.0
			H @ 20.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 11767 Proj. Name [illegible] Date 12-23-75

Hole No. 4 Hole Elev. 5220 ± MSL Hole Depth 15.0

Hole Type P/A Sample Types A/S - Log Auger

Depth to Bedrock 11.6 Depth to W.T. 7.0 Field Eng. V.C.

Ground Water Observation WW

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0	0.5		
0.5	2.0	SC	(1) moist — orange — silty
2.0	11.6	CL	(6) moist — brown
			with occ. gravel to 5.5 ± 7.0
			(1) sand + (1) cl. + moist @ 7.0 ± 10.5
			(1) moist @ 10.0
11.6	14.0	CH	(10)
14.0	15.0	CL	(11)
			H @ 2.0 H @ 11.6
			H @ 5.5 H @ 14.0
			- @ 7.0
			H @ 10.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

O.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

oj. No. 14967 Proj.Name NIC-080 ER 131960 Date 10-29-75

le No. 5 Hole Elev. 5224 ± MSL Hole Depth 35.0

ole Type D/9 Sample Types A/S - 2 1/2 hole

pth to Bedrock 30.0 Depth to W.T. 23.6 Field Eng. Mich

ound Water Observation

CLASSIFICATION OF LAYERS

Depth om	Depth to	Soil Symbol	Soil Description
0	0.7		(1)
.7	2.6	SC	(7) Med moist - Clayey - Silty
.6	7.6	SAA	(F) moist
.6	9.0	SC	(7) Wet - Silty
.0	30.0	CL	(2) Wet - V. Sandy - Silty
			U/ small layer of Gravel @ 22.6
0.0	35.0	CH	(11)
			NOT To much water
			C @ 2.6 H @ 22.6
			C @ 7.6 S @ 23.0
			H @ 9.0 H @ 30.0
			H @ 13.6
22.6	23.5	E.GM	

PENETRATION TEST RESULTS

epth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S - Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14967 Proj. Name N 186,200 E 2,122,200 Date 10-2?-??

Hole No. 6 Hole Elev. 5225 ± est Hole Depth 50.0

Hole Type D/A Sample Types S/S - Cal. Tube

Depth to Bedrock 47.0' Depth to W.T. 19.0 Field Eng. [illegible]

Ground Water Observation [illegible]

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	2.0		(1) Moist - Clay - Soil
2.0	5.6	SC	(2) Wet Moist - Silty
5.6	13.6	SM	(3) Wet Moist
13.6	47.0	CL	(4) Wet - U. Sandy - Silty
47.0	50.0	CH	(5)
			WET To Hard WATER
			small water in hole
			S @ 2.0 H @ 47.0
			S @ 5.6
			L @ 13.6
			H @ 22.6
			S @ 37.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tub

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14967 Proj. Name NIKE 399 52.182.080 Date 10-30-75

le No. 7 Hole Elev. 522 Est Hole Depth 45.0

Hole Type P/A Sample Types H/S — Log Hole

Depth to Bedrock 41.0 Depth to W.T. 17.6 Field Eng. Pic

Ground Water Observation [illegible]

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	4.0	CL	(2) MOIST — V. SANDY — SILTY
4.0	9.6	SC	(3) MOIST TO V. MOIST — SILTY
9.6	19.0	CL	(4) WET — V. SANDY — SILTY
19.0	23.0	SC	(5) WET — SLIGHTLY CLAYEY — SILTY
23.0	29.6	CL	(6) WET — V. SANDY — SILTY
29.6	41.0	SC	(7) WET — SILTY — W/SMALL LAYER OF CLAY @ 37.0 TO 37.6
41.8	45.0	CH	(11)
			LOTS OF WATER
			SMELL ODOR IN HOLE
			S @ 4.0
			H @ 9.6
			S @ 19.0
			H @ 23.0
			S @ 29.6
			H @ 37.0
			S @ 37.6
			H @ 41.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

Consulting Soil Engineers

Proj. No. 14967 Proj. Name N185.50 E2182.50 Date 10-20-75

Hole No. 8 Hole Elev. 5225 Hole Depth 45.0

le Type P/H Sample Types H/S - Log Ls/C

Depth to Bedrock 40.6 Depth to W.T. 23.0 Field Eng. Pick

Ground Water Observation [illegible]

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	2.0	SC	(2) med moist - clayey - silty
2.0	5.0	SM	(3) med moist
5.0	7.6	SC	(4) med moist - slightly clayey - silty
7.6	18.6	CL	(6) wet - sandy - silty
18.6	35.6	SC	(7) wet - silty
			slightly clayey @ 30.0 to 35.6
35.6	40.6	CL	(6) wet - v. sandy - silty
40.6	41.6	CH	(10)
41.6	45.0	CH	(11)
			LOTS OF WATER
			H @ 5.0 S @ 30.0
			H @ 7.6 H @ 35.6
			H @ 9.6 H @ 40.6
			S @ 18.6 H @ 41.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tub

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14767 Proj. Name N 125,635 E 2,142,926 Date [illegible]

le No. 9 Hole Elev. 5221.0 est Hole Depth 30.0

Hole Type P/A Sample Types A/C - U. 1.1/2

Depth to Bedrock 26.0 Depth to W.T. 12.0 Field Eng. [illegible]

Ground Water Observation [illegible]

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	[illegible]		(1)
0.7	2.0	CL	(2) MOIST - V. SANDY - SILTY
2.0	7.0	SC	(3) MOIST - SILTY
7.0	12.6	CL	(4) WET - V. SANDY - SILTY
12.6	26.0	SC	(7) WET - CLAYEY - SILTY
			W/ LAYER OF GRAVEL @ 22.0 & 22.6
26.0	28.0	CH	(10) SILTY CLAYSTONE
28.0	30.0	CH	(11)
			LOTS OF WATER
			SMELL ODOR IN HOLE
			S @ 2.0 H @ 26.0
			H @ 7.0 H @ 28.0
			S @ 12.6
			H @ 22.0
			S @ 22.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZERR AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14967 Proj. Name NJ ST 720 82.102.965 Date 10-30-75

Hole No. 13 Hole Elev. +2 3/4 est Hole Depth 20.0

Hole Type P/A Sample Types H.A. - Log hole

Depth to Bedrock 15.6 Depth to W.T. 11.0 Field Eng. R.L.

Ground Water Observation [illegible]

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	1.1		(1)
1.1	9.0	CL	(6) U. moist to wet - sandy
9.0	15.6	SC	(7) wet - slightly clayey - silty
15.6	17.0	CH	(10)
17.0	20.0	CH	(11)
			LOTS OF WATER
			S @ 9.0
			H @ 15.6
			H @ 17.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14967 Proj. Name NIMITZ E2.13.155 Date 10-22-75

Hole No. 11 Hole Elev. 5231 est Hole Depth 15.1

Hole Type P/A Sample Types H/S - Log hole

Depth to Bedrock 11.6 Depth to W.T. ~~NE~~ Field Eng. [illegible]

Ground Water Observation [illegible]

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.1		(1)
0.1	1.6	SC	(2) Med moist - Silty - Clayey
1.6	4.6	SM	(3) Med moist
4.6	7.6	SC	(4) moist - Clayey - Silty
7.6	11.6	CL	(5) V. moist & hard - V. Sandy - Silty
11.6	[illegible]	CH	(10)
14.0	15.0	CH	(11)

S @ 1.6
H @ 4.6
H @ 7.6
H @ 11.6
H @ 14.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 4967 Proj. Name N 184,270 E 582,220 Date 10-29-75

Hole No. 12 Hole Elev. 5246 Hole Depth 30.0

Hole Type P/A Sample Types A/S - Log Hole

Depth to Bedrock 28.0 Depth to W.T. DE Field Eng. Ric

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	14.6	SM	(2) Wet moist
14.6	17.0	CL	(3) V moist - stiff
17.0	19.0	SC	(4) Moist - stiff
19.0	28.0	CL	(5) V. moist - stiff
28.0	30.0	CH	(6)
			H @ 6.0
			S @ 14.6
			H @ 19.0
			H @ 28.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Solit Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 11767 Proj. Name N184,500 E2[illegible]10 Date 12-29-75

le No. 13 Hole Elev. 5211± est Hole Depth 41.0

Hole Type P/A Sample Types A/S - 2.0 Hole

Depth to Bedrock 37.0 Depth to W.T. 22.0 Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.7		(T)
0.7	16.0	SM	(T) Mod Moist
			Moist @ 12.0
16.0	29.0	SC	(T) Wet - Silty - Clayey
29.0	37.0	CL	(T) Wet - V. Sandy - Silty
37.0	40.0	CH	(T)
			NOT Too much WATER
			S @ 7.0
			H @ 16.0
			S @ 26.0
			S @ 29.0
			H @ 37.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

Consulting Soil Engineers

Proj. No. 14767 Proj. Name N 180,450 E 182,700 Date 12-29-75

Hole No. 14 Hole Elev. 6236 Hole Depth 50.0

Hole Type P/A Sample Types H/S - 1.00 1.1/8

Depth to Bedrock 42.0 Depth to W.T. 17.6 Field Eng. P.L.

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	2.0	SC	(2) med moist - silty
2.0	26.0	SM	(2) med moist
			moist @ 12.0
26.0	42.0	SC	(2) wet - c/med - silty
42.0	50.0	CH	(3)
			not to encl water
			S @ 7.6
			H @ 26.0
			H @ 42.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 14967 Proj. Name NH-760 F2,182,690 Date 11-29-75

Hole No. 15 Hole Elev. 5236.2 est Hole Depth 65.0

Hole Type D/H Sample Types A/S - Jar Info

Depth to Bedrock 56.0 Depth to W.T. 18.6 Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	[illegible]		(T)
0.6	2.6	SC	(T) mod moist - silty - C layey
2.6	17.0	SM	(T) mod moist
			moist @ 8.0
			wet @ 13.6
17.0	30.0	SC	(T) wet - slightly clayey - silty
30.0	42.6	SM	(T) wet
42.6	56.0	SC	(T) wet - slightly clayey - silty
56.0	60.0	CH	(T)
			NOT To much water
			S @ 13.6
			H @ 17.0
			H @ 42.6
			H @ 56.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

[illegible] AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 1967 Proj. Name [illegible] Date 10-29-65

Hole No. 16 Hole Elev. 5233 ± est Hole Depth 60.0

Hole Type H/A Sample Types H/S - 100 hole

Depth to Bedrock 56.0' Depth to W.T. 12.6' Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	[illegible]		[illegible]
[illegible]	12.6	SC	[illegible] - silty - clayey
			wet + slightly clayey @ 5.6
12.6	21.0	SM	(2) wet
21.0	39.6	SC	(3) wet - clayey - silty
39.6	56.0	SM	(2) wet
			w/ occ. hard @ 50.6 to 51.0
56.0	60.0	CH	(11)
			wet to moist water
			- @ 5.6 H @ 50.6
			H @ 21.0 S @ 56.0
			H @ 26.0 H @ 57.6
			- @ 34.6
			H @ 40.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Sholby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 4967 Proj. Name N 134 170 E 2,183,000 Date 10-30-75

Hole No. 17 Hole Elev. 5236± est Hole Depth 50.0

Hole Type P/A Sample Types H/S - 2" O.D. split

Depth to Bedrock 46.0 Depth to W.T. 21.0 Field Eng. Kiel

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth To	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	1.6	SC	(7) Med moist - Slightly clayey - silty
1.6	11.0	SM	(2) Med moist
11.0	14.0	SC	(7) Med moist - slightly clayey - silty
14.0	37.0	SM	(2) wet
37.0	46.0	CL	(6) wet - V. SANDY - silty
46.0	49.0	SM	(12) w/ small pockets of clay-like
49.0	50.0	CH	(11)
			Lots of water
			H @ 11.0 H @ 46.0
			S @ 14.0
			H @ 27.0
			H @ 37.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 1-1767 Proj.Name N135.085 E2,183,150 Date 10-29-75

Hole No. 18 Hole Elev. 5236 ± est Hole Depth 35.0

Hole Type P/P Sample Types H/S - Log Hole

Depth to Bedrock 29.6 Depth to W.T. 17.0 Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	14.0	SC	(7) Mixed moist - Clayey - Silty
			moist @ 6.0
14.0	18.6	SM	(7) wet
18.6	21.0	SC	(7) wet - slightly clayey - silty
21.0	26.0	CL	(8) wet - V. sandy
26.0	29.6	SC	(7) wet -
29.6	32.6	SM	(13)
32.6	35.0	CH	(11)
			WT To much water
			H @ 6.0
			H @ 15.6
			H @ 29.6
			H @ 32.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14757 Proj. Name NISSAN 52,183,340 Date 10-29-75

Hole No. 17 Hole Elev. 5235± cut Hole Depth 30.0

Hole Type D/H Sample Type H/S [illegible]

Depth to Bedrock 20.6 Depth to W.T. 16.6 Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	[illegible]		[illegible]
0.6	2.6	SC	[illegible] med moist - silty
2.6	6.0	SM	[illegible] med moist
6.0	15.0	SC	[illegible] wet - slightly clayey
			[illegible] @ 10.0
15.0	20.6	CL	(6) wet - sandy
20.6	26.0	SM	(3) wet
26.0	30.0	CH	(11)
			Lots of water
			Smell odor in hole
			S @ 6.0 H @ 26.0
			H @ 10.0
			S @ 15.0
			H @ 20.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2" O.D. Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14767 Proj. Name N 185 470 E 2,123,675 Date 10-27-75

Hole No. 20 Hole Elev. ~2450 est Hole Depth 40.0

Hole Type P/A Sample Types H/S - 2" hole

Depth to Bedrock 5.6 Depth to W.T. 15.6 Field Eng. Fick

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	4.0	SC	(7) M. d moist & moist
			Layers of clay & sand
4.0	5.6	CL	(6) moist & v. moist
5.6	9.6	SM	(10) med moist & moist
9.6	36.0	SM	(13) WET @ 14.0
36.0	38.0	CH	(11)
38.0	40.0	CH	(15) Blue shale
			LOTS of WATER
			Small odor in hole
			S @ 4.0 H @ 35.0
			S @ 5.6 H @ 38.0
			H @ 9.6
			V. H @ 25.6
			S @ 27.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tub

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 4-1967 SPC Proj. Name E 2117[illegible] N 179.500 Date 10-29-75

Hole No. 21 Hole Elev. [illegible] Hole Depth 25.0

Hole Type P/T Sample Types A/S - Log hole

Depth to Bedrock 18.0 Depth to W.T. 11.6 Field Eng. Pic

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	2.6	SC	(7) med moist - silty
			Slightly clayey @ 1.6 to 2.6
2.6	5.0	SM	(7) wet moist
5.0	18.0	SC	(7) moist - clayey - slightly clayey @ 13.5
			wet @ 7.0 18.0
18.0	25.0	CH	(11)
			Lots of water
			S @ 1.6 H @ 19.6
			H @ 2.6
			S @ 7.0
			H @ 18.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tub

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 4967 Proj. Name [illegible] E2,186,700 Date 10-29-75

Hole No. 22 Hole Elev. 526.4± est Hole Depth 20.0

Hole Type H/A Sample Types A/S – Log hole

Depth to Bedrock 14.0 Depth to W.T. 17.0 Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth To	Soil Symbol	Soil Description
0.0	5.6		(9) MOIST – C/A – SANDY
5.6	14.0	CL	(10) WET – V. SANDY
14.0	16.6	CH	(10)
16.6	20.0	CH	(11)
			NOT TO much WATER
			C @ 5.6
			H @ 14.0
			H @ 16.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14967 Proj. Name [illegible] Date 12-29-75

le No. 23 Hole Elev. 2650 est Hole Depth 15.0

Hole Type P/A Sample Types A/S - Log hole

Depth to Bedrock 10.6 Depth to W.T. ~~[illegible]~~ 8.6 Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	7.0	SC	(7) Wet moist - silty
			slightly clayey @ 2.6 to 5.0
7.0	10.6	CL	(2) V. moist - V. stiff
			wet @ 8.6
10.6	12.0	CH	(10)
12.0	15.0	CH	(11)
			S @ 2.6
			S @ 7.0
			H @ 10.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2" o.d. Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 14967 Proj. Name [illegible] Date 10-29-75

Hole No. 24 Hole Elev. [illegible] Hole Depth 10.0

Auger Type P/H Sample Types A/S — 1 per hole

Depth to Bedrock 8.0 Depth to W.T. ~~6.2~~ Field Eng. Rich

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0.0	1.0		(3) moist - clayey - sandy
1.0	3.0	SC	(2) med moist - silty slightly clayey @ 2.0 ± 2.0
3.0	6.0	SM	(5) med moist
6.0	8.0	CL	(6) moist - sandy - v. cl.
8.0	10.0	CH	(10)
			H @ 2.0
			S @ 4.6
			H @ 8.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 14967 Proj. Name N 27 SR7 [illegible] 350 Date 10-29-75

Hole No. 25 Hole Elev. 5246 ± est Hole Depth 10.0

Hole Type P/H Sample Types H/S – Liq. Lite

Depth to Bedrock 8.0 Depth to W.T. ~~NE~~ Field Eng. Rich

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	1.6		(2) moist – CL Lean clay
1.6	6.0	SM	(2) moist
6.0	8.0	SC	(2) moist – C/Hard – silty
8.0	10.0	CH	(10) w/Layer of sandstone @ 8.0 ±
			S @ 1.6
			H @ 8.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Sholby Tube

Consulting Soil Engineers

Proj. No. 14967 Proj. Name [illegible] Date 1-20-75

Hole No. 26 Hole Elev. 5263' est Hole Depth 10.0

Hole Type P/H Sample Types H/S - 1.a 1.b

Depth to Bedrock 8.6 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.2		(1) MOIST - CLAY - SANDY
0.2	6.6	SM	(2) med moist
6.6	8.6	SC	(7) med moist to moist - slightly clayey SILTY
8.6	10.0	CH	(10)
			H @ 6.6
			H @ 8.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 14767 Proj. Name [illegible] Date 12-22-75

Hole No. 27 Hole Elev. [illegible] Hole Depth 15.0

Hole Type P/H Sample Types A/S – 2" O.D. Tube

Depth to Bedrock 7.0 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.6		Clay
0.6	3.6	SC	Brown moist – Slightly plastic
3.6	7.0	CL	Brown moist – Sandy
7.0	15.0	CH	Brown – with layers of sandstone @ 7.6 ± 8.3 + 9.0 ± 9.6
			H @ 3.6
			H @ 7.0
			H @ 9.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZERF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 4176 Proj. Name N 150,900 E 2,187,975 Date 11-29-71

le No. 28 Hole Elev. 5262± est Hole Depth 15.0

nole Type P/A Sample Types A/S - 1½ hole

Depth to Bedrock 8.0 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	5.6	SC	(2) mod moist
5.6	8.0	CL	(3) moist - sandy - C-L
8.0	15.0	CH	(4) w/ Layer of sandstone @ 8.0 ± 8.5
			" " " " @ 12.0 ± 12.5
			5 @ 2.0
			H @ 5.6
			H @ 8.0
			H @ 12.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 4967 Proj. Name [illegible] Date 10-27-[illegible]

Hole No. 29 Hole Elev. ~582 est Hole Depth 10.0

Hole Type P/A Sample Types H/S - [illegible]

Depth to Bedrock 6.6 Depth to W.T. ~~N/E~~ Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.6		(T)
0.6	2.6	CL	(T) mod moist - V. SANDY - SILTY
2.6	6.6	SC	(T) mod moist - SILTY - CLAYEY
6.6	8.0	CH	(T)
8.0	10.0	CL	(T)
			S @ 2.6
			H @ 6.6
			H @ 8.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2" [illegible] Spoon Sample Cal. - California Spoon S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 1967 Proj. Name NIBI-50 E2,13[illegible]925 Date 12-29-75

Hole No. 30 Hole Elev. 5253± est Hole Depth 10.0

Hole Type P/A Sample Types H.S. - 2.0 I.D.

Depth to Bedrock 5.0 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	5.0	CL	(2) Hard moist - V. Sandy - Silty.
5.0	7.0	CH	(3)
7.0	10.0	CH	(4)
			H @ 5.0
			H @ 6.0
			H @ 7.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

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Consulting Soil Engineers

Proj. No. 4967 Proj. Name [illegible] Date [illegible]

Hole No. 31 Hole Elev. [illegible] Hole Depth 10.0

Hole Type P/A Sample Types H/S - [illegible]

Depth to Bedrock 6.0' Depth to W.T. ~~NE~~ Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	[illegible]		[illegible]
0.6	2.6	SC	(1) mod. moist - clayey - [illegible]
2.6	6.0	SM	(2) med. moist - [illegible]
6.0	10.0	CH	(11)
			S @ 2.6
			H @ 6.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 1967 Proj. Name N 182,450 E 2,184,975 Date [illegible]

Hole No. B2 Hole Elev. 5278 est Hole Depth 15.0

Hole Type D/H Sample Types H/S - Jar Grab

Depth to Bedrock 10.0' Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0.0	0.6		(1)
0.6	3.0	CL	(2) Red moist - U.S. Sandy - Silty
3.0	6.6	SC	(3) Red moist - Silty - Clayey
6.6	10.0	CL	(4) Red moist & moist - Sandy - Clay
10.0	11.0	CH	(5)
11.0	15.0	C-R	(6) Red Layer of Sandstone @ 11.0 & 11.5
			C @ 3.0
			H @ 6.6
			H @ 10.0
			H @ 11.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 14767 Proj. Name N 132,760 E 2,127,975 Date 12-22-64

Hole No. 33 Hole Elev. 525.0 est Hole Depth 15.0

Hole Type P/A Sample Types P/S - 2" O.D. Split

Depth to Bedrock 12.6 Depth to W.T. NE Field Eng. D.A.

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth To	Soil Symbol	Soil Description
0.0	0.4		(1)
0.4	2.6	SC	(2) Sand moist - silty
2.6	8.6	SM	(3) Sand moist
8.6	12.6	SC	(4) Sand moist — slightly silty
			Silty — V. C-F
12.6	15.0	CH	(10)
			S @ 2.4
			H @ 6.0
			H @ 8.6
			H @ 12.4

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

O.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 14967 Proj.Name N183,020 E1,167,730 Date 12-[illegible]

Hole No. 34 Hole Elev. 5255 ± est Hole Depth 20.0

Hole Type P/A Sample Types A/S - Log 1.16

Depth to Bedrock 16.0' Depth to W.T. ~~NE~~ Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0.0	0.3		(1)
0.3	3.0	SC	(2) Lt moist - Silty Lt. Clayey - V silty
2.0	9.0	SM	(3) Med moist
			moist 6.6
9.0	16.0	CL	(4) V. moist - Sandy
16.0	18.0	CH	(5)
18.0	20.0	CL	(6)
			5 @ 6.6
			H @ 9.0
			L @ 16.0
			H @ 18.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tu

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Consulting Soil Engineers

Proj. No. 1-1967 Proj. Name N 183,300 E 2,187,425 Date 10-30-75

le No. 35 Hole Elev. 526.1 ± Hole Depth 20.0

Hole Type P/A Sample Types S/S — 2½" hole

Depth to Bedrock 19.0 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.4		(1)
0.4	3.6	SC	(7) lt moist - slightly clayey - V. silty
3.6	8.6	SM	(8) mod moist
8.6	19.0	CL	(6) moist - V. sandy - silty
			c/cs. gravel @ 8½ to 9.0
19.0	20.0	CH	(10)
			S @ 3.6
			H @ 9.6
			H @ 11.6
			H @ 16.6
			H @ 19.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14967 Proj. Name N183,600 E2,187,180 Date [illegible]

Hole No. 36 Hole Elev. 5261 est Hole Depth 20.0

Hole Type P/H Sample Types [illegible]

Depth to Bedrock 16.0 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.4		(1)
0.4	16.0	SC	(7) med moist - slightly clayey - silty
			w/ [illegible] 6.6 to 9.6
16.0	17.6	CH	(10)
17.6	20.0	CH	(11)
			Small odor in hole
			V.H @ 6.6
			S @ 9.6
			H @ 16.0
			H @ 17.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tub

Consulting Soil Engineers

Proj. No. 14767 Proj. Name N183,025 E2,136,200 Date 10-30-75

Hole No. 37 Hole Elev. 6252 ± est Hole Depth 20.0

le Type P/A Sample Types A/5 - 2½" I.D.

Depth to Bedrock 10.0 Depth to W.T. ~~A/E~~ Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.4		(1)
0.4	5.0	SC	(7) med moist — slightly clayey — U.S. 17
5.0	10.0	GW	(9) lt moist — sandy
10.0	13.6	SM/CL	(10)
13.6	20.0	CH	(11)
			EXPENSES — 1 4" Auger
			1 Rock Bit
			U. S. @ 5.0
			S @ 10.0
			H @ 13.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tub

Consulting Soil Engineers

Proj. No. 14967 Proj. Name N 191,000 E 2,184,400 Date 10-30-75

Hole No. 38 Hole Elev. 52 ± 3' est Hole Depth 25.0

Hole Type P/H Sample Types H/S - Log & Cl

Depth to Bedrock 19.6 Depth to W.T. NE Field Eng. Kiehl

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	2.0		(1)
0.4	2.0	SC	(2) Mod moist - slightly clayey - v. silty
2.0	10.0	SM	(3) Mod moist
10.0	12.0	SC	(4) Mod moist - slightly clayey - silty
12.0	19.6	CL	(5) Moist - sandy
			w/ occ lenses @ 13.6 ± 17.0
19.6	25.0	CH	(11)
			H @ 6.6
			H @ 12.0
			H @ 13.6
			H @ 19.6
			H @ 24.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tub

Consulting Soil Engineers

Proj. No. 14967 Proj. Name NIMITZ E2,186,350 Date 4-30-67

Hole No. 39 Hole Elev. 52 ± 2 ft Hole Depth 30.0

Hole Type P/A Sample Types H/- - Log hole

Depth to Bedrock 24.0 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0.0	0.2		(1)
0.2	11.0	SM	(2) med moist
11.0	13.0	SC	(3) med moist - V. silty - slightly clayey
13.0	24.0	CL	(4) V. moist - Sandy - silty
24.0	30.0	CH	(11)
			H @ 11.0
			H @ 12.0
			S @ 13.0
			H @ 17.0
			H @ 24.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Sholby Tube

Consulting Soil Engineers

Proj. No. 14967 Proj. Name N 154,770 E2,126,060 Date 10-28-75

Hole No. 40 Hole Elev. 6256.0 est Hole Depth 25.0

Hole Type P/H Sample Types H/S - Log Pile

Depth to Bedrock 23.6 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0.0	0.4		(1)
0.4	1.0	SC	(7) sl moist - v. silty - slightly clayey
1.0	11.0	SM	(7) med moist
11.0	14.0	SC	(7) med moist - slightly clayey - v. silty
14.0	23.6	CL	(6) moist - sandy - silty
			v. moist @ 15.0
			w/ occ. gravel @ 19.0 to 21.0
23.6	25.0	CH	(10)
			H @ 6.0
			H @ 11.0
			H @ 14.0
			H @ 23.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d. Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14967 Proj. Name N185,100 E 2,195,760 Date 10-30-75

le No. 41 Hole Elev. 520.9± est Hole Depth 25.0

Hole Type C/F Sample Types H/S – 2½" hole

Depth to Bedrock 23.6 Depth to W.T. NE Field Eng. [illegible]

Ground Water Observation

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.4		(1)
0.4	1.0	SC	(2) DF moist – slightly clayey – V. silty
1.0	13.6	SM	(3) mod moist
13.6	16.0	SC	(7) mod moist – slightly clayey – V. silty
16.0	23.6	CL	(5) V. moist – sandy – silty
23.6	25.0	CH	(10)
			H @ 4.0
			H @ 13.6
			H @ 16.0
			H @ 23.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

Consulting Soil Engineers

Proj. No. 14767 Proj. Name _____ Date 10-30-75

Hole No. 42 Hole Elev. _____ Hole Depth 20.0

Hole Type P/H Sample Types H/S — Log Hole

Depth to Bedrock 17.0 Depth to W.T. 17.0 Field Eng. [illegible]

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	17.0	CL	(6) MOIST - SAND & U SAND
			U. MOIST @ 3.0
			WET + some weathered @ 14.0
17.0	20.0	CH	(12)
			NOT To much WATER
			H @ 5.0
			H @ 17.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 14967 Proj. Name _____ Date 10-22-75

Hole No. 43 Hole Elev. _____ Hole Depth 20.0

Hole Type P/A Sample Types A/S - Log Hole

Depth to Bedrock 18.6 Depth to W.T. 10.6 Field Eng. [illegible]

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	9.6	CL	(6) MOIST - V. SANDY - SILTY
			V. MOIST - ± [illegible] - C 3.0
9.6	15.0	SC	(7) WET - SLIGHTLY CLAYEY - SILTY
15.0	18.6	CL	(6) WET - V. SANDY - SILTY
18.6	20.0	CH	(10)
			LOTS of WATER
			V SOFT @ 9.6 to 15.0
			H @ 15.0
			H @ 18.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

[illegible] ASSOCIATES
Consulting Soil Engineers

Proj. No. 14967 Proj. Name _____ Date 10-30-75

Hole No. 44 Hole Elev. _____ Hole Depth 30.0

Hole Type P/A Sample Types A/S - Log 1 hole

Depth to Bedrock 24.6 Depth to W.T. 9.0 Field Eng. Pic

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	3.6	CL	(5) MOIST - V. SANDY - SILTY
3.6	17.0	SC	(7) V. MOIST to WET - SILTY
			WET @ 9.0 — SLIGHTLY CLAYEY @ 9.0.
17.0	24.6	SC	(9) WET - V. SANDY - SILTY 17.
24.6	30.0	CL	(11)
			LITS of WATER
			S @ 3.6
			S @ 9.0
			W @ 17.0
			W @ 24.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14967 Proj. Name _____ Date 10-30-75

Hole No. 45 Hole Elev. _____ Hole Depth 25.0

Hole Type P/H Sample Types H/S - Log hole

Depth to Bedrock 19.0 Depth to W.T. 13.6 Field Eng. [illegible]

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	2.6	SC	(2) Med moist - clayey - silty
2.6	13.0	CL	(6) V. moist - sandy - silty
13.0	17.6	SC	(7) wet - slightly clayey
17.6	19.0	CL	(6) wet - v. sandy - silty
19.0	25.0	CH	(10)
			LOTS of WATER
			5 @ 9.0
			5 @ 13.0
			H @ 17.6
			H @ 19.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"- d Split Spoon Sample Cal. - California Spoon S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 11947 Proj. Name _____ Date 12-30-75

Hole No. 4 Hole Elev. _____ Hole Depth 25.0

Hole Type P/A Sample Types A/A — Log hole

Depth to Bedrock 22.0 Depth to W.T. 15.0 Field Eng. P.A.

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	2.6	CL	(6) med moist — V. SANDY
2.6	4.6	CL	(7) med moist
4.6	10.6	CL	(5) moist — V. SANDY
			V. CAL. + V. moist @ 7.0
10.6	22.0	SP	(8) med moist
			V. moist @ 13.6
			WET @ 15.0
22.0	25.0	CH	(11) w/ LAYer of STONE @ 22.0 to 22
			H @ 2.6
			S @ 4.6
			S @ 7.0 LOTS of WATER
			H @ 10.6
			H @ 22.0 SMALL ODOR IN HOLE
			H @ 22.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Sholby Tube

Consulting Soil Engineers

roj. No. 14967 Proj. Name _____ Date 10-22-75

ole No. 47 Hole Elev. _____ Hole Depth 20.0

ole Type P/A Sample Types A/S - Log hole

epth to Bedrock 18.0 Depth to W.T. 11.0 Field Eng. Rick

round Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth To	Soil Symbol	Soil Description
5.0	0.7		(1)
0.7	4.0	CL	(6) moist - V. SANDY
4.0	6.0	SC	(7) moist
6.0	9.0	CL	(6) V. moist - V. SANDY
			v. caf. @ 7.6 ± 9.0
9.0	11.0	SC	(7) V. moist
11.0	16.0	SM	(8) moist
			WET @ 12.6
16.0	18.0	SW	(9) WET - W/ GS. Hard
18.0	20.0	CH	(10)
			LOTS OF WATER
			SMELL ODOR IN HOLE
			H @ 4.0 H @ 16.0
			S @ 6.0 H @ 18.0
			H @ 9.0
			S @ 11.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

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Proj. No. 14967 Proj. Name _____ Date 10-30-75

lo No. 48 Hole Elev. _____ Hole Depth 20.0

Hole Type P/A Sample Types A/S - Log Hole

Depth to Bedrock 17.6 Depth to W.T. 10.0 Field Eng. Rich

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	7.6	CL	(6) MOIST - M. STIFF
7.6	11.0	SC	(7) WET - CLAYEY - V. COL.
			SLIGHTLY CLAYEY @ 9.0 TO 11.0
11.0	17.0	SM	(5) DENSE
			W/ GRAVEL @ 12.0 TO 13.0
17.0	20.0	CH	(11)
			LOTS OF WATER
			SMALL ODOR IN HOLE
			S @ 7.6
			H @ 12.0
			S @ 13.0
			H @ 17.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tul

Consulting Soil Engineers

Proj. No. 14967 Proj. Name _____ Date 10-30-75

Hole No. 49 Hole Elev. _____ Hole Depth 20.0

Hole Type P/A Sample Types A/S — Log hole

Depth to Bedrock 15.6 Depth to W.T. 9.6 Field Eng. Rich

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	4.0		(3) moist - clay - sandy
4.0	9.0	CL	(6) wet - v. sandy - silty
9.0	15.6	SC	(7) wet - slightly clayey
			more clay + some weathered (7)
15.6	20.0	CH	(15)
			Lots of water
			Smell odor in hole
			S @ 4.0
			H @ 14.0
			H @ 15.6

14.
15

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Sholby Tub

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Consulting Soil Engineers

Proj. No. 14967 Proj. Name _____ Date 10-30-75

le No. 50 Hole Elev. _____ Hole Depth 35.0

Hole Type P/P Sample Types A/S — 200 h,s/c

Depth to Bedrock 34.0 Depth to W.T. 10.0 Field Eng. P.C.

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	8.0		(3) moist - c/f sand - silty
			V. moist @ 5.0
8.0	16.0	CL	(4) moist - V. sandy - silty
16.0	34.0	SM	(5) wet
			c/f to c. sand @ 32.6 to 33.0
34.0	35.0	CL-ML	(10)
			LOTS OF WATER
			S @ 5.0
			S @ 16.0
			H @ 32.6
			H @ 34.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

Consulting Soil Engineers

Proj. No. 14967 Proj. Name _____ Date 10-30-75

Hole No. S1 Hole Elev. _____ Hole Depth 20.0

Hole Type P/A Sample Types A/S - 2" hsle

Depth to Bedrock 17.0 Depth to W.T. 6.0 Field Eng. Fiel

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	2.0		(E) moist - o/a - sand.
2.0	5.0	CL	(F) moist - v/ sandy
5.0	12.1	CL	(F) wet - [illegible] o/a - silty
12.0	17.0	SP	(F) wet
17.0	20.0	CL	(F)
			Lots of water
			H @ 13.0
			H @ 17.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Proj. No. 14767 Proj. Name ______ Date 10-30-75

Hole No. 52 Hole Elev. ______ Hole Depth 27.0

.o Type P/A Sample Types H/S - Loo hole

Depth to Bedrock 25.0 Depth to W.T. 6.6 Field Eng. [illegible]

Ground Water Observation ______

CLASSIFICATION OF LAYERS

Depth from	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	4.0	CL	(6) moist - v. sandy
			v. moist @ 2.6
4.0	25.0	SC	(7) wet - clayey - silty
			[illegible] @ 9.0 to 12.0
			[illegible] @ 22.6 to 23.0
25.0	27.0	CH	(1)
			Lots of water
			S @ 2.6
			S @ 4.0
			H @ 16.0
			H @ 22.6
			H @ 25.0

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d.Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

- KAL ZEFF AND ASSOCIATES
Consulting Soil Engineers

Proj. No. 14767 Proj. Name _____ Date 10-30-75

le No. 53 Hole Elev. _____ Hole Depth 33.0

Hole Type P/A Sample Type H/S - 2 on hole

Depth to Bedrock 30.0 Depth to W.T. 16.6 Field Eng. Rich

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth to	Soil Symbol	Soil Description
0.0	0.7		(1)
0.7	15.0	SM	(2) Med moist
			Moist @ 3.0
			V. moist @ 7.6
15.0	18.6	SC	(3) wet - Slightly c/mpct. - V. silty
18.6	30.0	SM	(4) wet
			w/ occ. Med @ 22.6 to 23.0
			" " " @ 27.6 to 28.6
30.0	33.0	CH	(11) clayey @ 27.6 to 30.0
			LOTS OF WATER
			H @ 5.0
			H @ 15.0
			S @ 18.6
			H @ 22.6
			S @ 23.0
			H @ 27.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d. Split Spoon Sample. Cal. - California Spoon. S.T. - Shelby Tube

Consulting Soil Engineers

Proj. No. 14967 Proj. Name _____ Date 10-30-75

Hole No. 54 Hole Elev. _____ Hole Depth 50.0

Hole Type P/A Sample Types A/S - 2" I.S.

Depth to Bedrock 45.0 Depth to W.T. 45.0 Field Eng. Rich

Ground Water Observation _____

CLASSIFICATION OF LAYERS

Depth From	Depth To	Soil Symbol	Soil Description
0.0	0.7		TOPSOIL
0.7	13.6	SM	(8) med moist
13.6	18.0	SC	(7) med moist - slightly clayey - V. silty
18.0	21.6	CL	(6) moist - V. SANDY - SILTY
21.6	26.6	SC	(7) moist - SILTY
26.6	28.6	SW	(9) moist - W/ occ. Gravel
28.6	31.0	SM	(8) med moist
31.0	33.6	SC	(7) moist - W/ occ. Lime Gravel - CLAYEY
33.6	45.0	CL	(6) moist - SANDY to V. SANDY
45.0	50.0	CH	(11) - WET @ 42.6
			H @ 13.6 H @ 45.0
			H @ 18.0 S @ 47.6
			H @ 21.6
			H @ 26.6 LOTS OF WATER
			S @ 28.6 AFTER 42.6
			H @ 31.0
			S @ 42.6

PENETRATION TEST RESULTS

Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon	Depth	Blow Count	Type of Spoon

S.S. - 2"o.d. Split Spoon Sample. Cal. - California Spoon. S.T. - Sholby Tube

1) TOPSOIL Clay - sandy - silty

ASPHALT, CONCRETE

3) FILL-clay, sandy ~~cinders (%), rubble (%), trash (%)~~

4) CLAY, sandy, silty, very soft, very moist, wet, brown

5) CLAY, sandy, silty, medium stiff, lt., med., very moist, wet, brown

6) CLAY, sandy to very sandy, silty, very med stiff to extremely stiff, lt to med. to very moist, to wet, brown - w/ occ. Gravel

7) CLAY, very sandy to SAND, clayey, soft to stiff, lt to moist, brown, occasionally gravelly to wet

8) SAND, slightly silty to silty, poorly graded, firm to dense, ~~dry~~, lt to med to very moist to wet, some gravel, ~~cobbles & boulders~~

9) SAND SW / w/ mc GRAVEL, well graded, ~~loose~~, medium dense to dense, lt to med to very moist to wet, ~~some cobbles & boulders~~

0) CLAY (severely weathered claystone) ; NO STONE very stiff, moist

1) CLAYSTONE BEDROCK (Shale), weathered, firm to medium hard, to V. hard, moist, yellow, brown, gray-Green

2) CLAYSTONE BEDROCK (Shale), weathered, firm, medium hard, hard, moist, yellow, brown, gray

3) SANDSTONE BEDROCK, weathered, medium hard, hard, some pockets of claystone, yellow-brown

4) SILTSTONE BEDROCK (Shale), weathered, firm to hard,

5) Blue shale BEDROCK (Shale), very hard - claystone

6) SANDSTONE-CLAYSTONE BEDROCK (Shale), weathered, firm, hard, yellow-brown

SANDSTONE (conglomerate BEDROCK hard

8)

JOB NO. 14967

IF NO CONTOURS ON SITE PLAN, DESCRIBE TOPOGRAPHY (I.E. LEVEL, SLOPING, ROLLING, HILLY). INCLUDE SLOPE DIRECTION(S), DESIGNATE FEATURES (HILLS, GULLIES, ETC.) ON PLAN Sloping IN ALL DIRECTIONS

2. WHAT IS PRESENT USE OF SITE? RMA

3. TYPE OF VEGETATION ON SURFACE GRASS-weeds

4. ARE THERE SHRINKAGE CRACKS IN SURFACE? NO WIDTH _____ DEPTH ___

5. IS THERE EVIDENCE OR HISTORY OF CUT AND/OR FILL ON THE SITE (DESIGNATE ON PLAN)? yes — Fill + CUT

6. DEPTH OF TOPSOIL (USE SHOVEL TO DETERMINE) 0.3 To 0.7

7. ARE THERE ANY PONDS, CREEKS, SEEPS, IRRIGATION DITCHES, OR OTHER EVIDENCE OF WATER (DESIGNATE ON PLAN, GET ELEVATIONS)? yes - Creeks + Ponds

8. ARE THERE ANY ROCK OUTCROPS? NO (DESIGNATE ON SITE PLAN, BRING SAMPLE TO LAB)

9. ARE THERE COBBLES AND/OR BOULDERS AT SURFACE (DESIGNATE AREAS ON SITE PLAN)? NO

DESCRIBE ANY EXISTING BUILDINGS, BASEMENTS OR EXCAVATIONS ON SITE OR ADJACENT TO IT, EXCLUDING TYPE OF FOUNDATION AND LOADING, IF AVAILABLE. PLANT Buildings

1. ARE EXISTING BUILDINGS IN NEIGHBORHOOD DAMAGES FROM FOUNDATION MOVEMENT? IF YES, GIVE ADDRESS AND/OR LOCATION. NO

2. WOULD HOLES STAND OPEN FOR DRILLED PIERS? NO APPROXIMATELY HOW DEEP? — FOR BELLED PIERS? yes AT WHAT DEPTH IN Bedrock

3. WERE HOLES LEFT OPEN? yes WHY? W/T

4. WOULD YOU RECOMMEND TAKING ADDITIONAL WATER-TABLE MEASUREMENTS? yes

5. DATE DRILLING WAS COMPLETED 10-30-75

6. WERE LOCAL ENGINEER AND ARCHITECTS CONTACTED? (IF OUT OF TOWN) —

7. ANY OTHER COMMENTS, SUGGESTIONS OR CAUTIONS —

R: 1

WATER TABLE

DATE: 10-31-75

HOLE NUMBER	HOLE DEPTH×	DEPTH TO WATER××	DEPTH TO MUD××	DEPTH TO×× DRY BOTTOM	REMARKS
7	45.0	6.6			
8	45.0	12.6			
9	30.0	6.6			
10	20.0	6.0			
11	15.0			14.0	
17	50.0	17.0			
34	20.0			17.0	CAVED
35	20.0			18.6	CAVED
36	20.0			15.6	CAVED
37	20.0			16.6	CAVED
38	25.0			18.6	CAVED
39	30.0	21.6			
40	25.0		24.6		
41	25.0		24.6		
42	20.0	7.0			
43	20.0	6.6			
44	30.0	7.0			
45	25.0	10.0			
46	25.0	12.6			
47	20.0	13.0			
48	20.0	8.0			
49	20.0	5.0			
50	35.0	5.6			
51	20.0	7.6			
52	27.0	4.6			
53	33.0	11.6			
54	50.0	32.0			

JOB NO. 14967 CHECKED BY: RICH + JOE

× FROM FIELD ENGINEER'S DRILL LOGS

×× GROUND SURFACE TO WATER/MUD/DRY BOTTOM

NOTE: IF HOLE IS CAVED INDICATE IN REMARKS

WATER TABLE DATE: 10-30-75

HOLE MBER	HOLE DEPTH*	DEPTH TO WATER**	DEPTH TO MUD**	DEPTH TO** DRY BOTTOM	REMARKS
5	35.0	10.0			
6	50.0	14.0			
12	30.0	25.6			
13	40.0		11.0		CAVED
14	50.0	14.0			
15	60.0	16.0			
16	60.0	8.0			
18	35.0	14.0			
19	30.0	12.0			
20	40.0	18.0			
21	25.0	9.0			
2	20.0	10.0			
23	15.0	10.6			
24	10.0			9.0	
25	10.0			9.0	
26	10.0			9.6	
27	15.0	11.0			
28	15.0			12.6	CAVED
29	10.0			8.0	CAVED
30	10.0			8.0	CAVED
31	10.0			8.0	CAVED
32	15.0			14.0	
33	15.0			10.0	CAVED

JOB NO. 14947 CHECKED BY: RICH + JOE

* FROM FIELD ENGINEERS DRILL LOGS

** GROUND SURFACE TO WATER/MUD/DRY BOTTOM

NOTE : IF HOLE IS CAVED, INDICATE IN REMARKS

WATER TABLE

DATE: 12-29-75

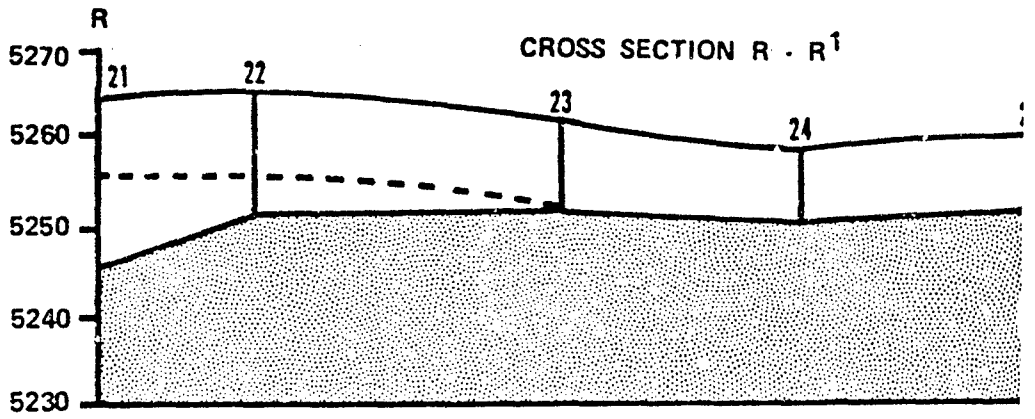
HOLE MBER	HOLE DEPTH×	DEPTH TO WATER××	DEPTH TO MUD××	DEPTH TO×× DRY BOTTOM	REMARKS
1	22.0	15.1			
2	20.0	16.9			
3	23.3			22.0	
4	15.0			14.2	

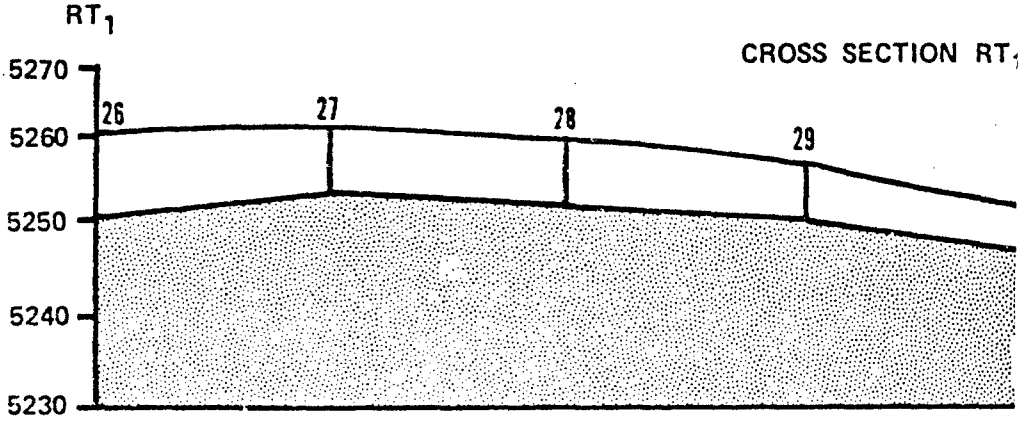
)B NO. 14747 CHECKED BY: RICH + JOE

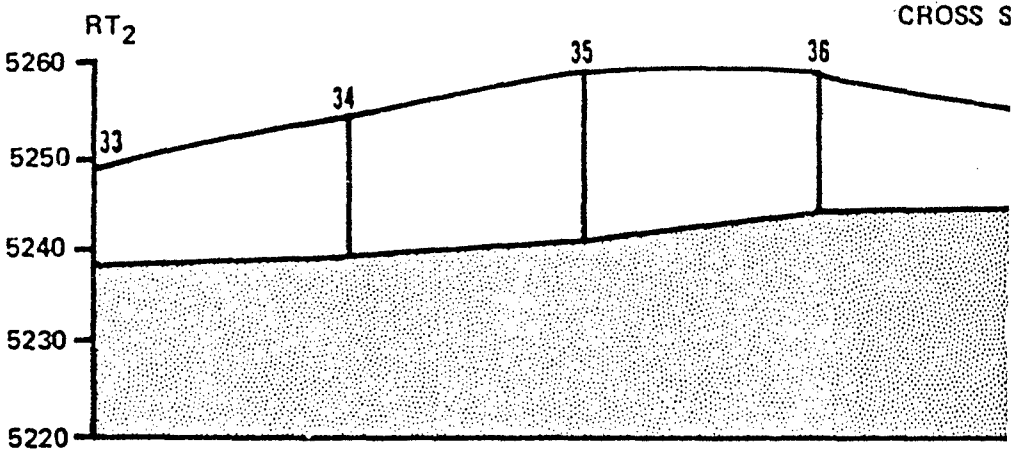
FROM FIELD ENGINEERS DRILL LOGS

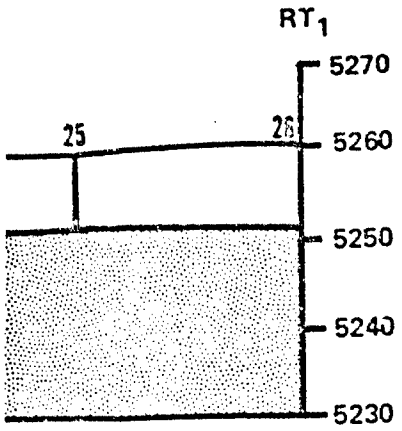
GROUND SURFACE TO WATER/MUD/DRY BOTTOM

TE : IF HOLE IS CAVED, INDICATE IN REMARKS

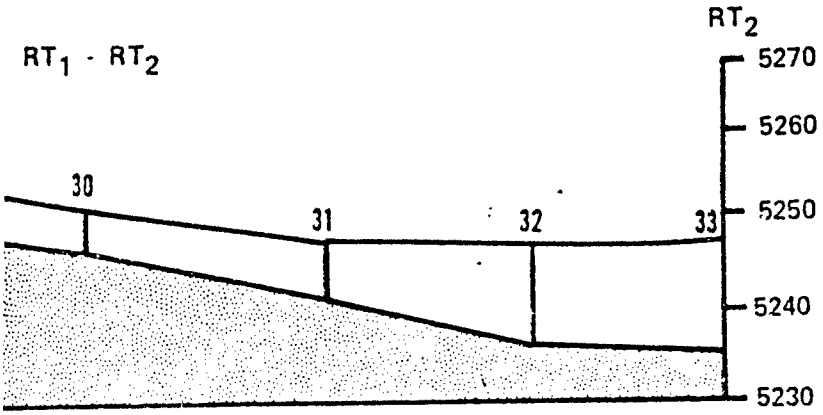

R
CROSS SECTION R - R'
5270
5260
5250
5240
5230
21
22
23
24

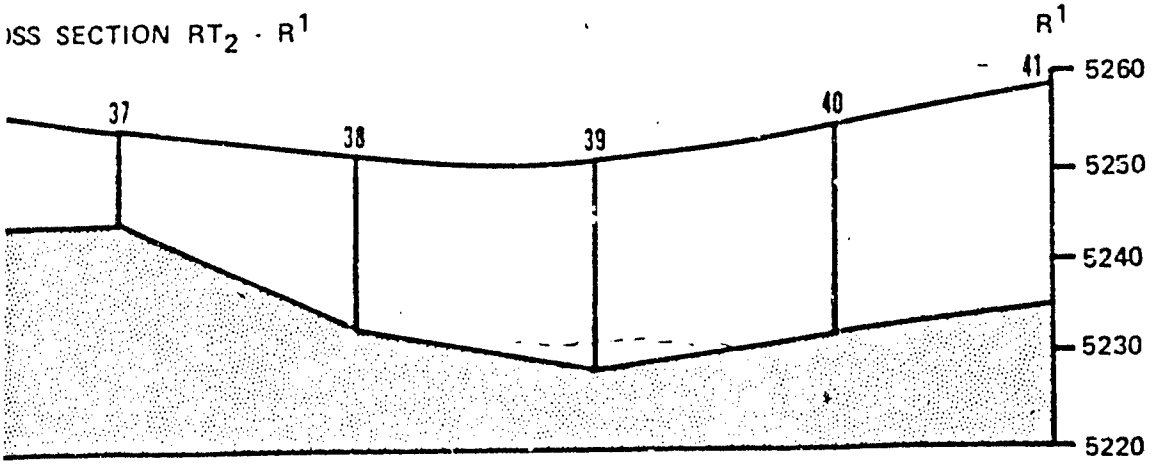

RT1
CROSS SECTION RT1
5270
5260
5250
5240
5230
26
27
28
29

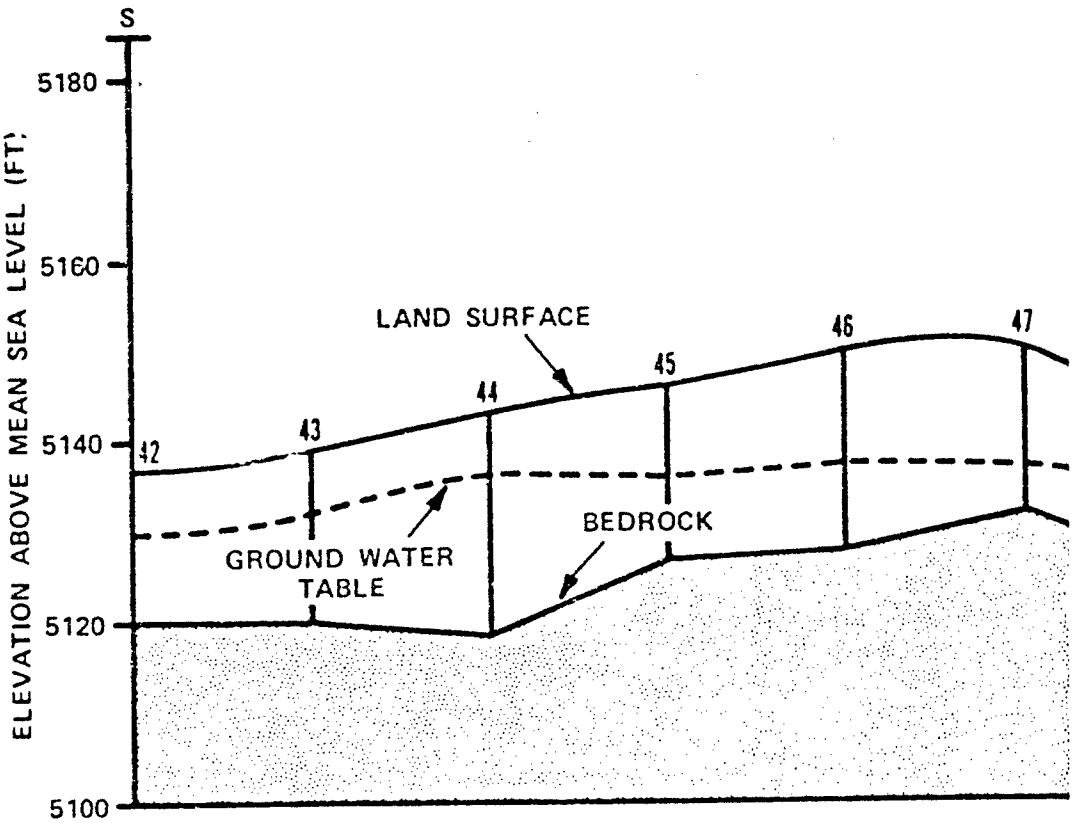

RT2
CROSS S
5260
5250
5240
5230
5220
33
34
35
36

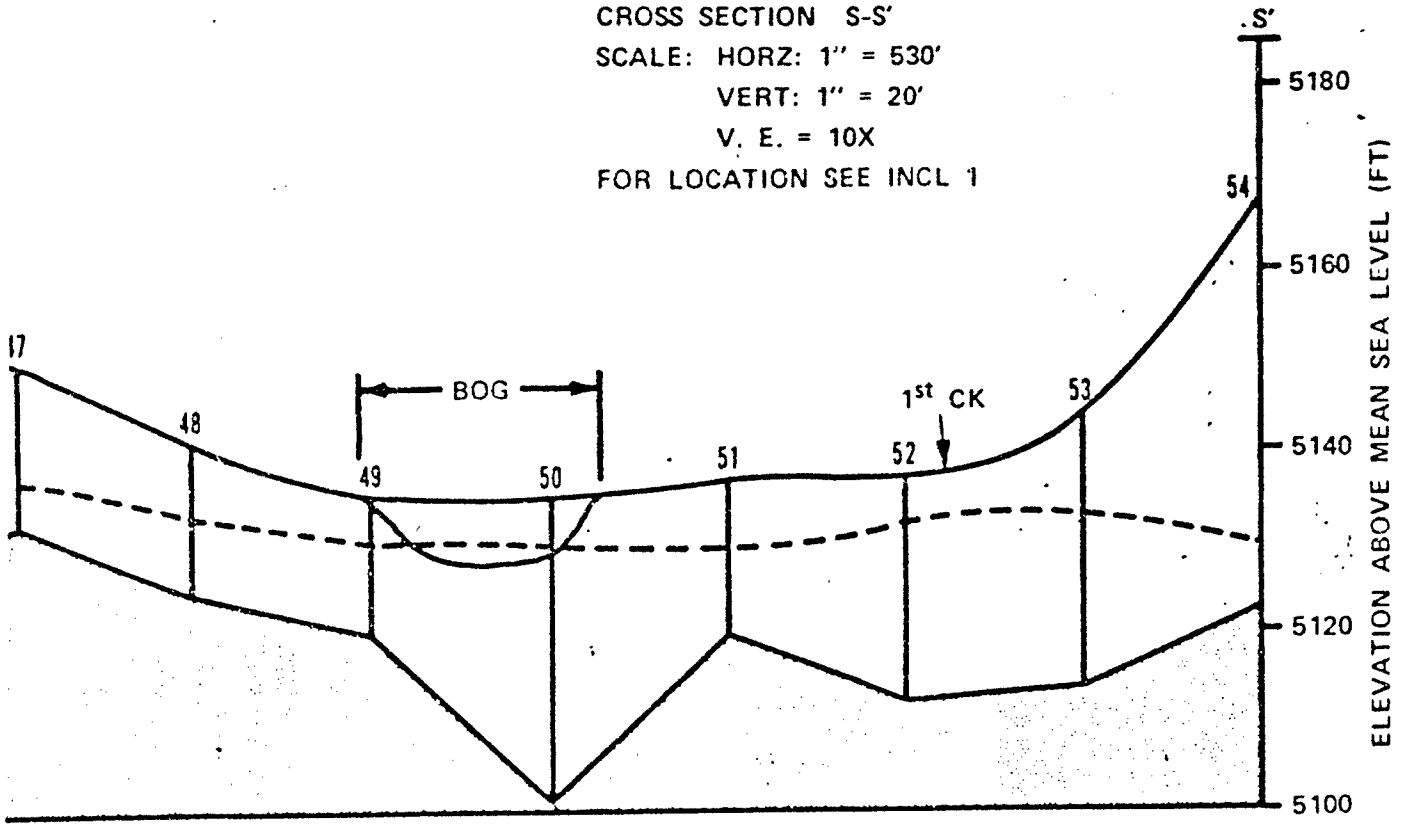


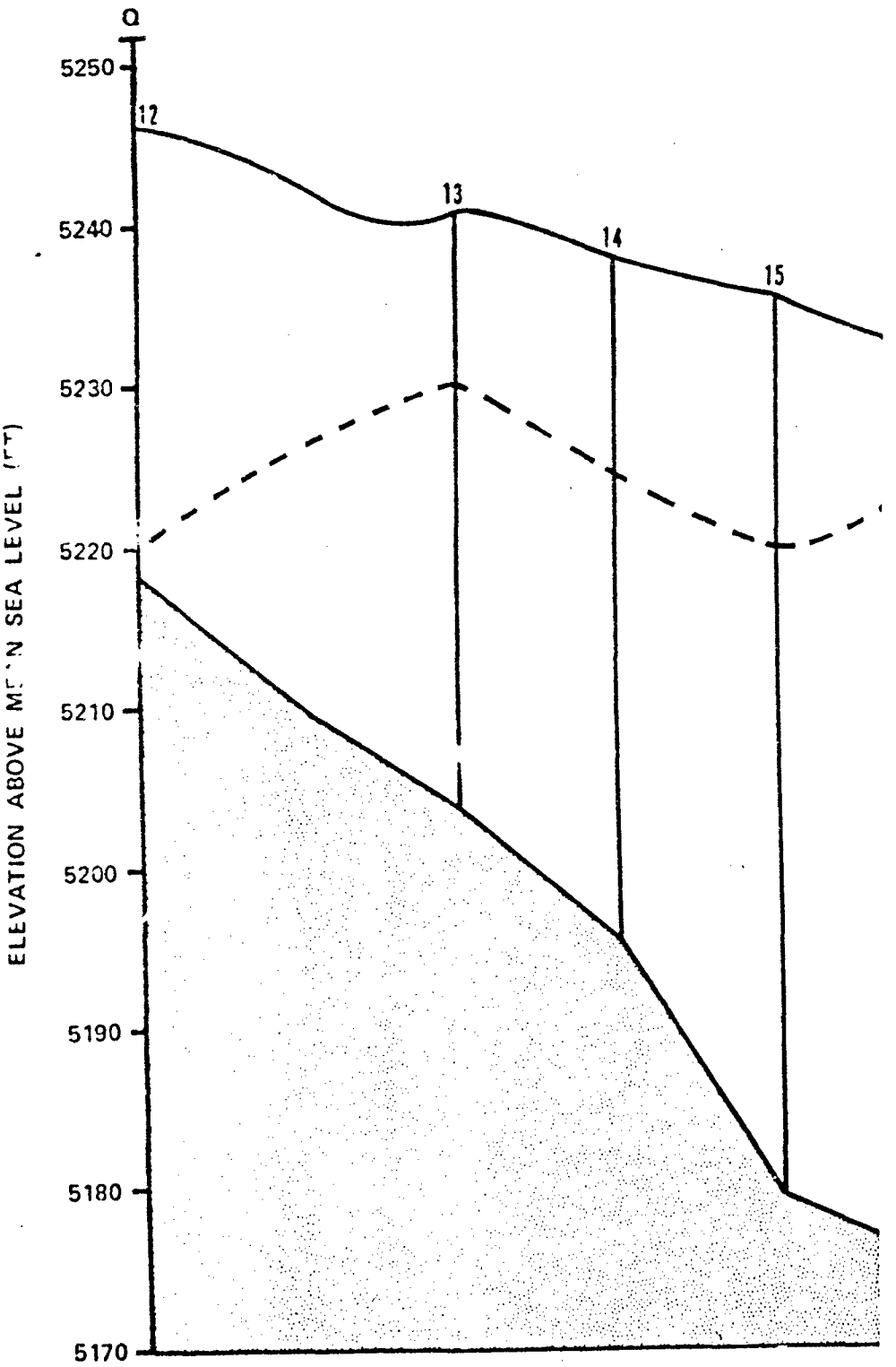
SCALE: HORZ: 1" = 300'
VERT: 1" = 20'

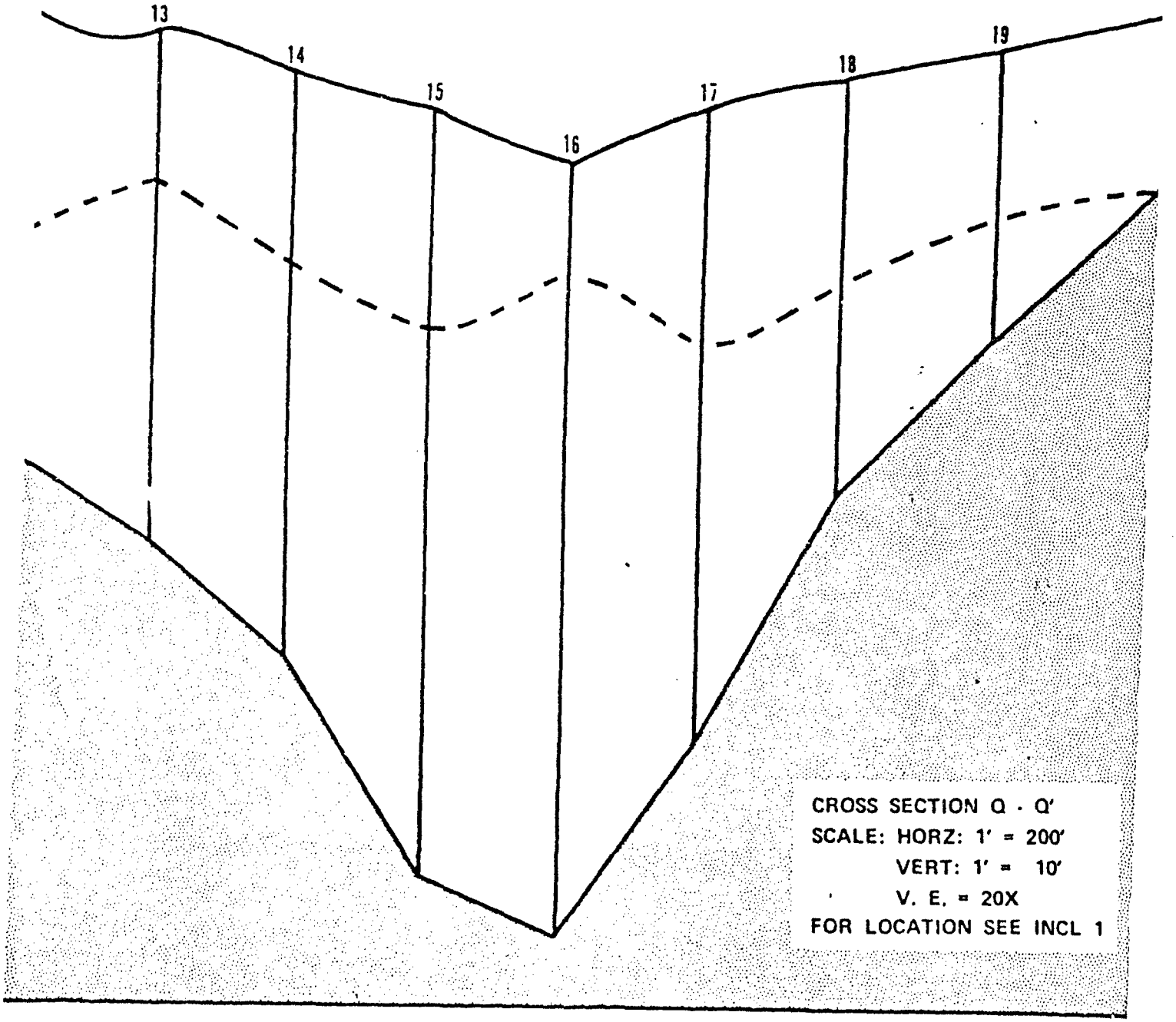


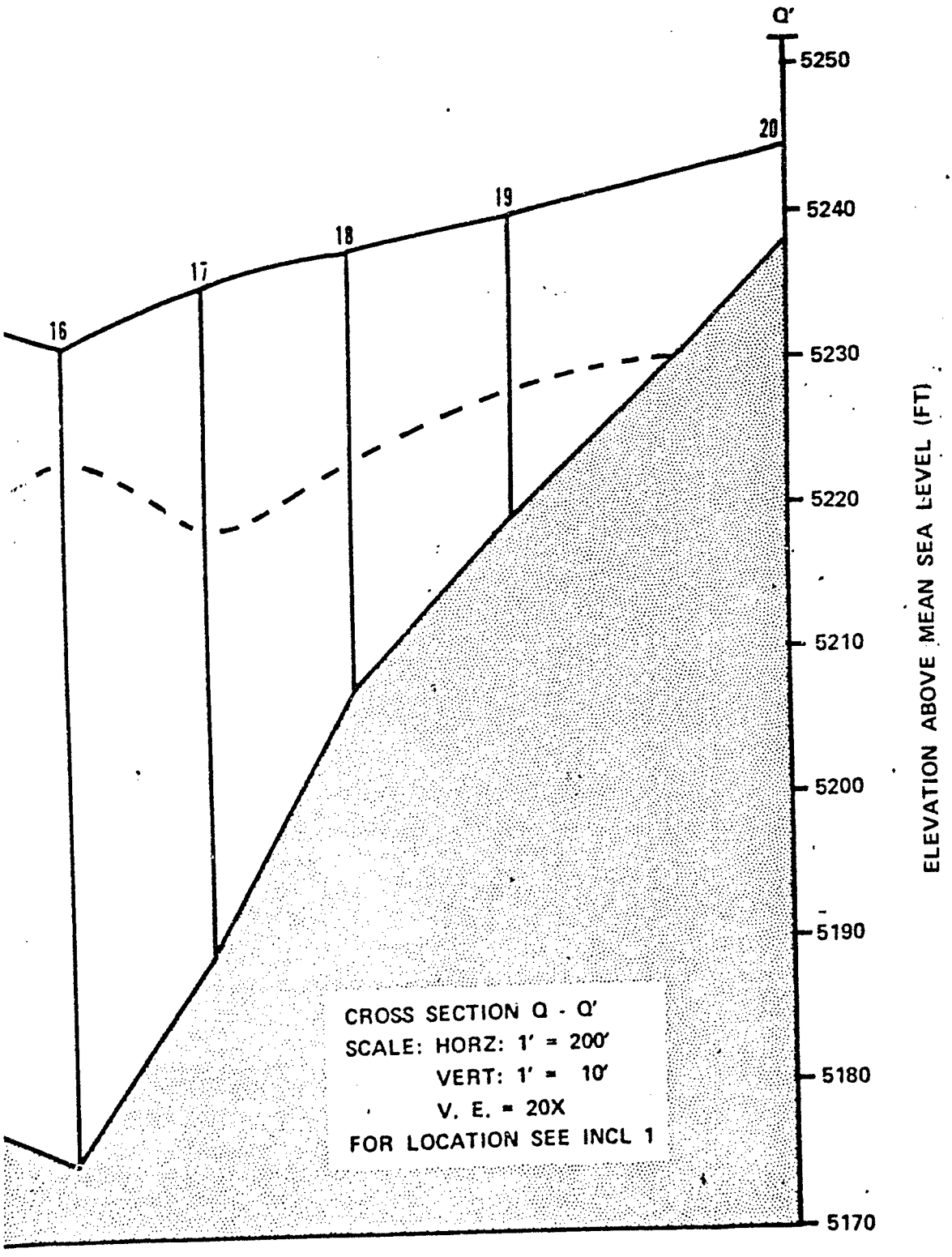


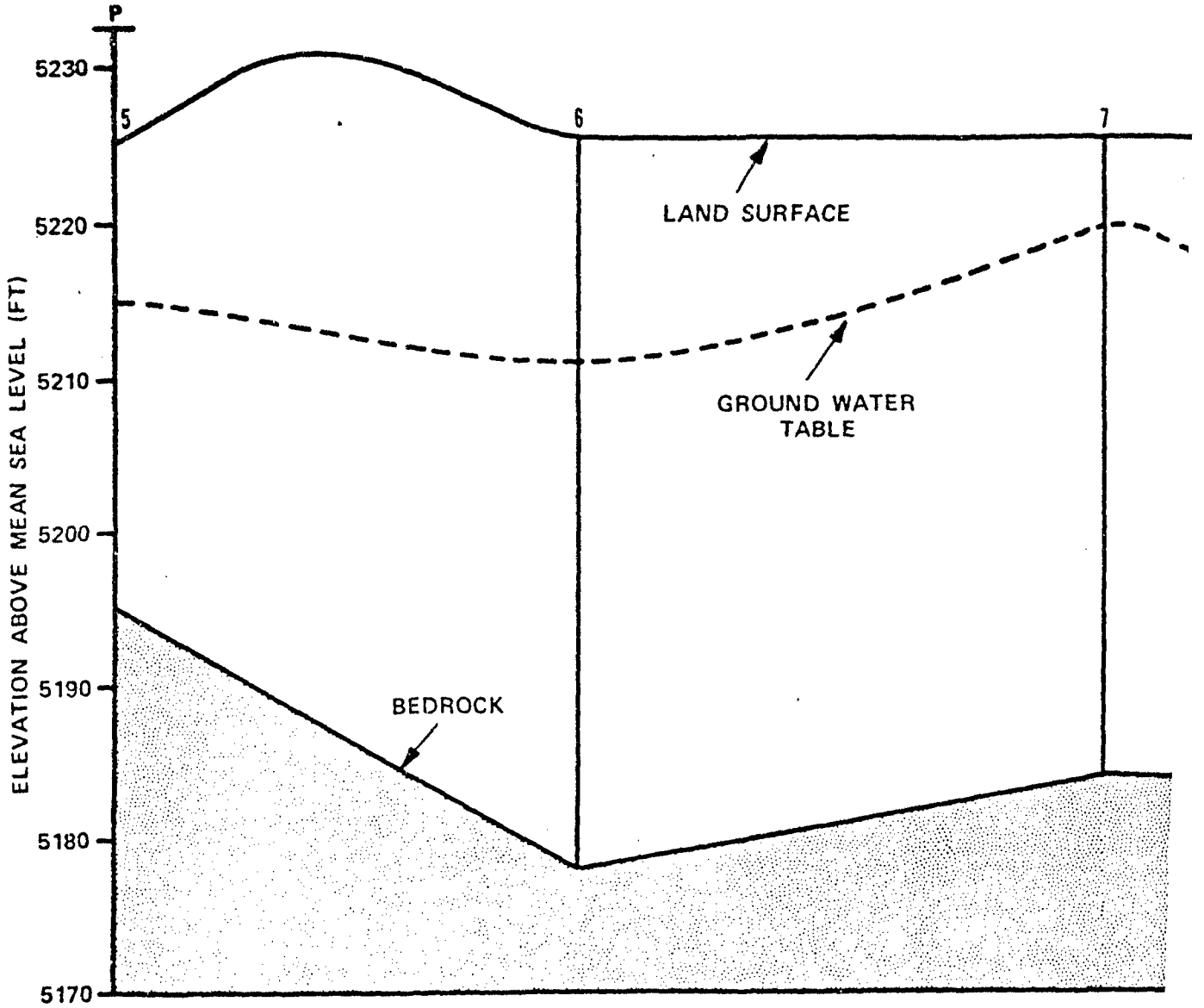

S
5180
5160
5140
5120
5100
ELEVATION ABOVE MEAN SEA LEVEL (FT)
LAND SURFACE
42
43
44
45
46
47
GROUND WATER TABLE
BEDROCK

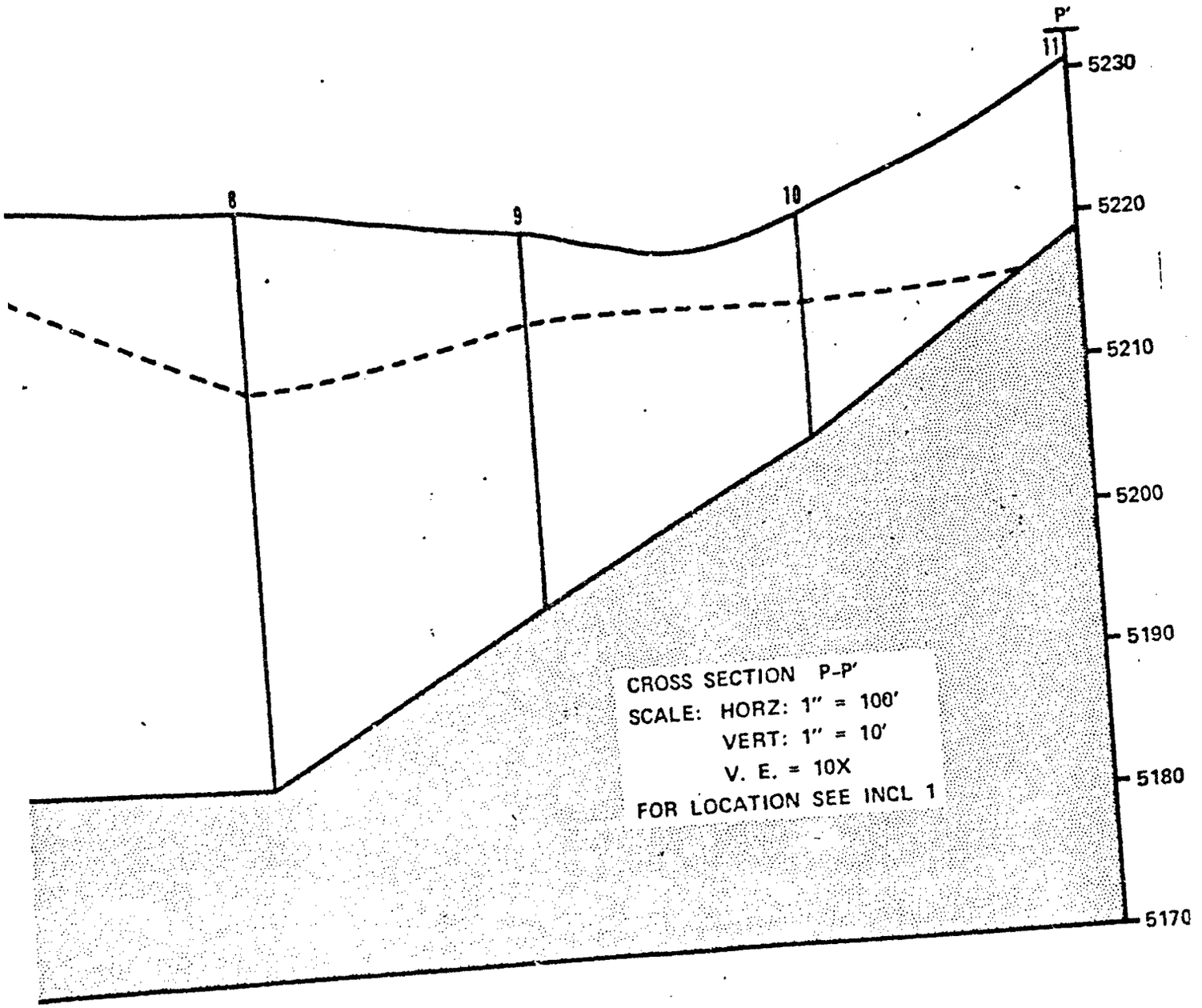

CROSS SECTION S-S'
SCALE: HORZ: 1" = 530'
VERT: 1" = 20'
V. E. = 10X
FOR LOCATION SEE INCL 1
S'
5180
5160
5140
5120
5100
ELEVATION ABOVE MEAN SEA LEVEL (FT)
47
48
49
50
51
52
53
54
BOG
1st CK

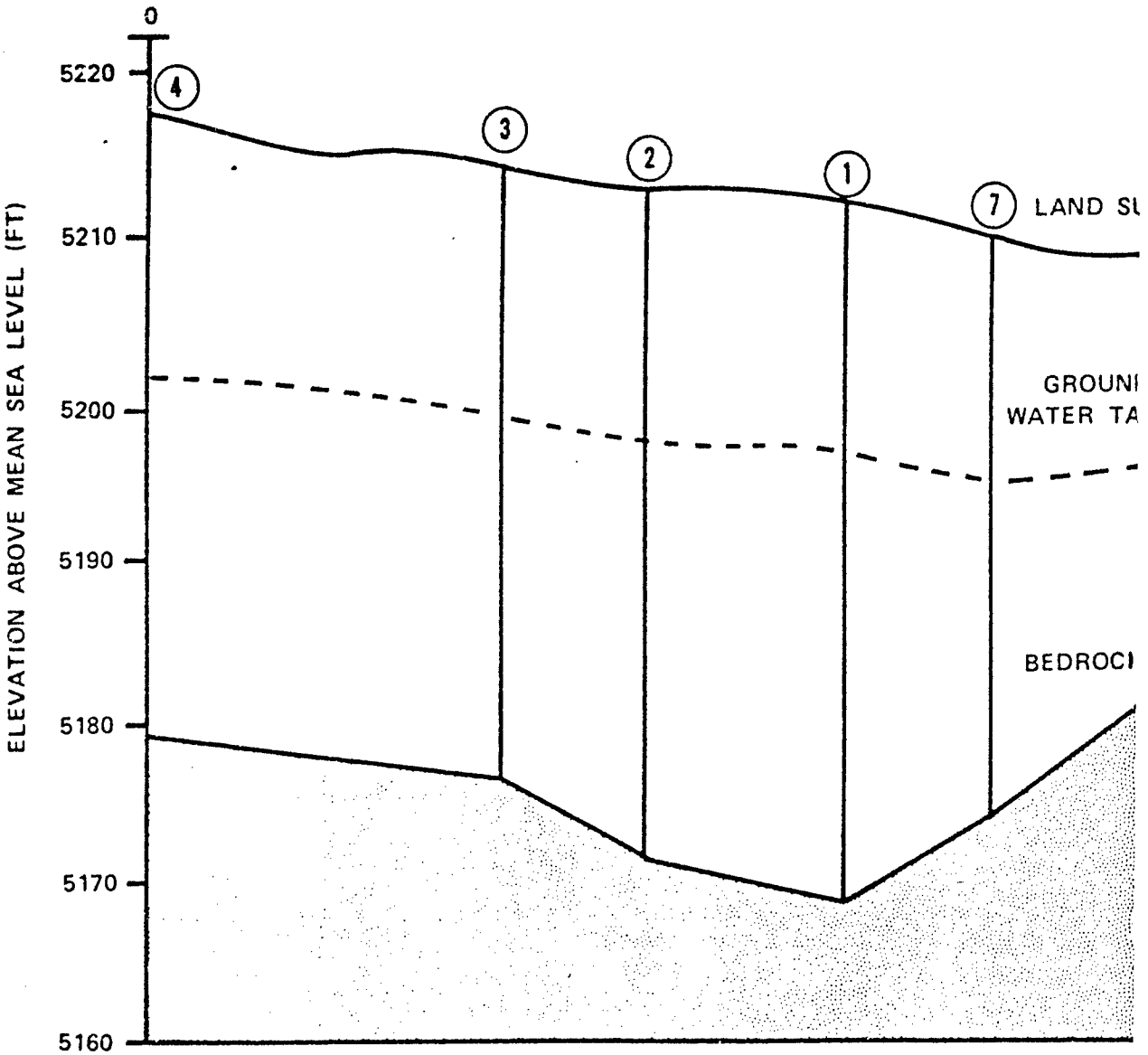

Q
5250
5240
5230
5220
5210
5200
5190
5180
5170
12
13
14
15
ELEVATION ABOVE MEAN SEA LEVEL (FT)

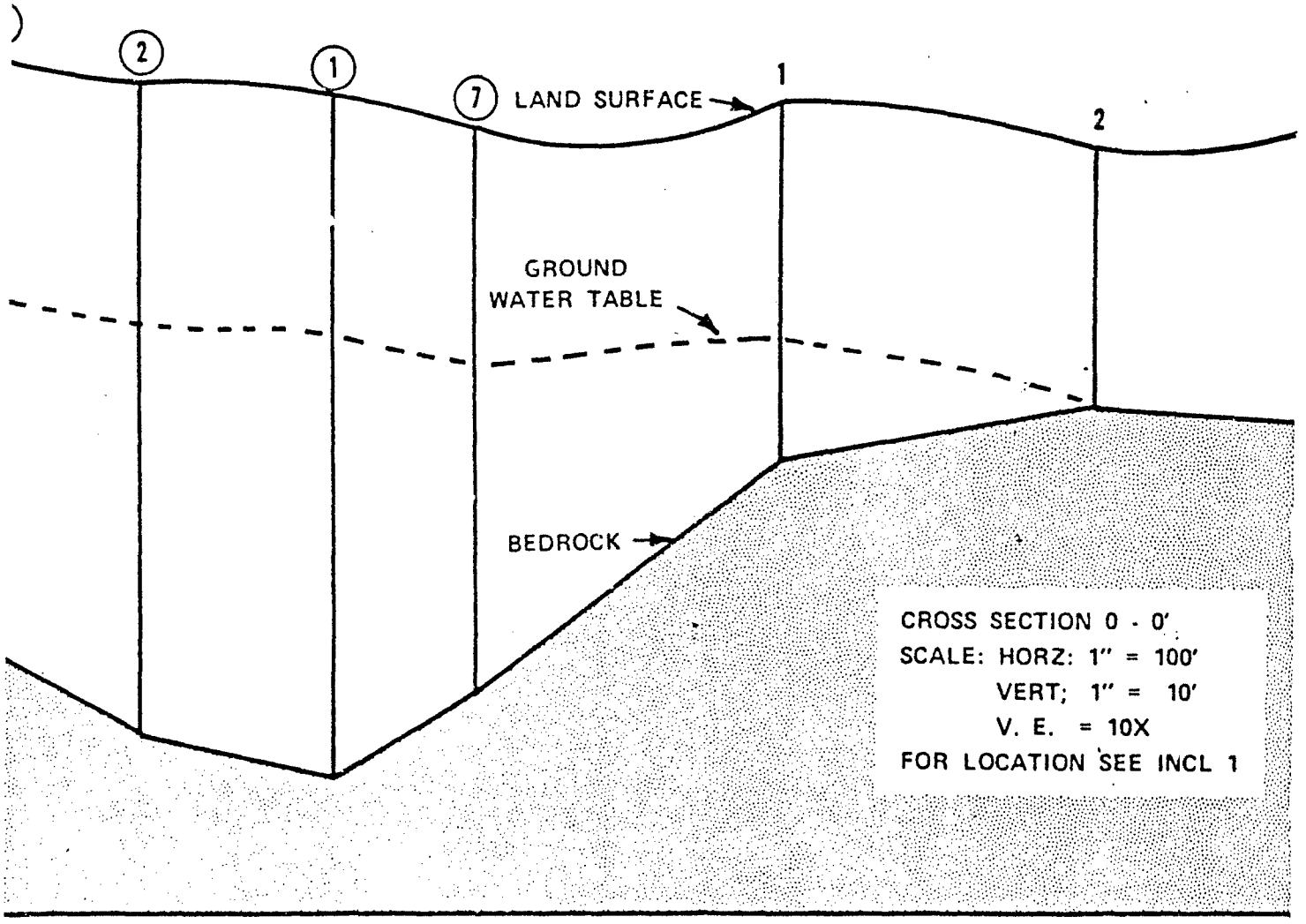

13
14
15
16
17
18
19
CROSS SECTION Q - Q'
SCALE: HORZ: 1' = 200'
VERT: 1' = 10'
V. E. = 20X
FOR LOCATION SEE INCL 1

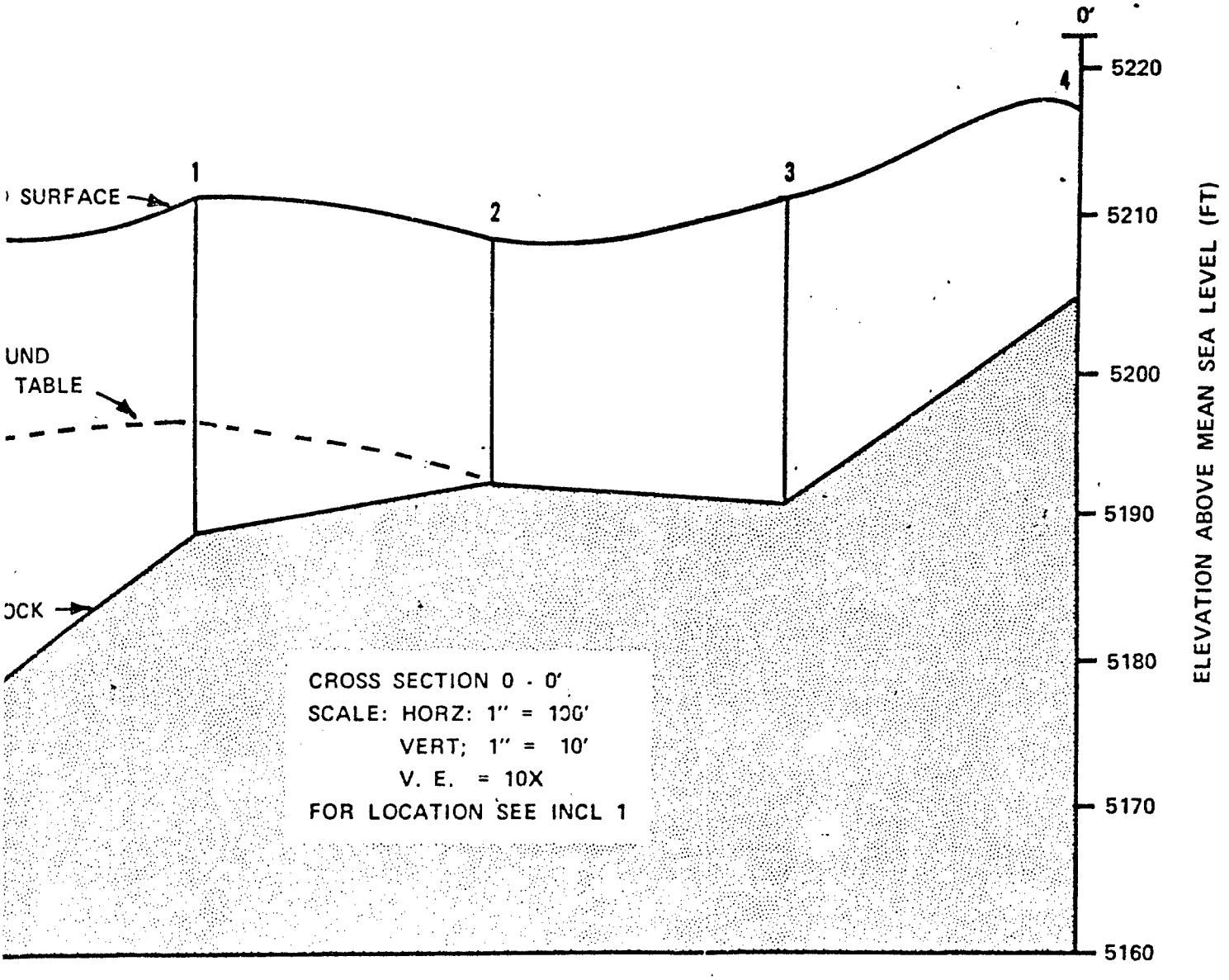

Q'
5250
20
19
18
17
16
5240
5230
5220
5210
5200
5190
5180
5170
ELEVATION ABOVE MEAN SEA LEVEL (FT)
CROSS SECTION Q - Q'
SCALE: HORZ: 1' = 200'
VERT: 1' = 10'
V. E. = 20X
FOR LOCATION SEE INCL 1

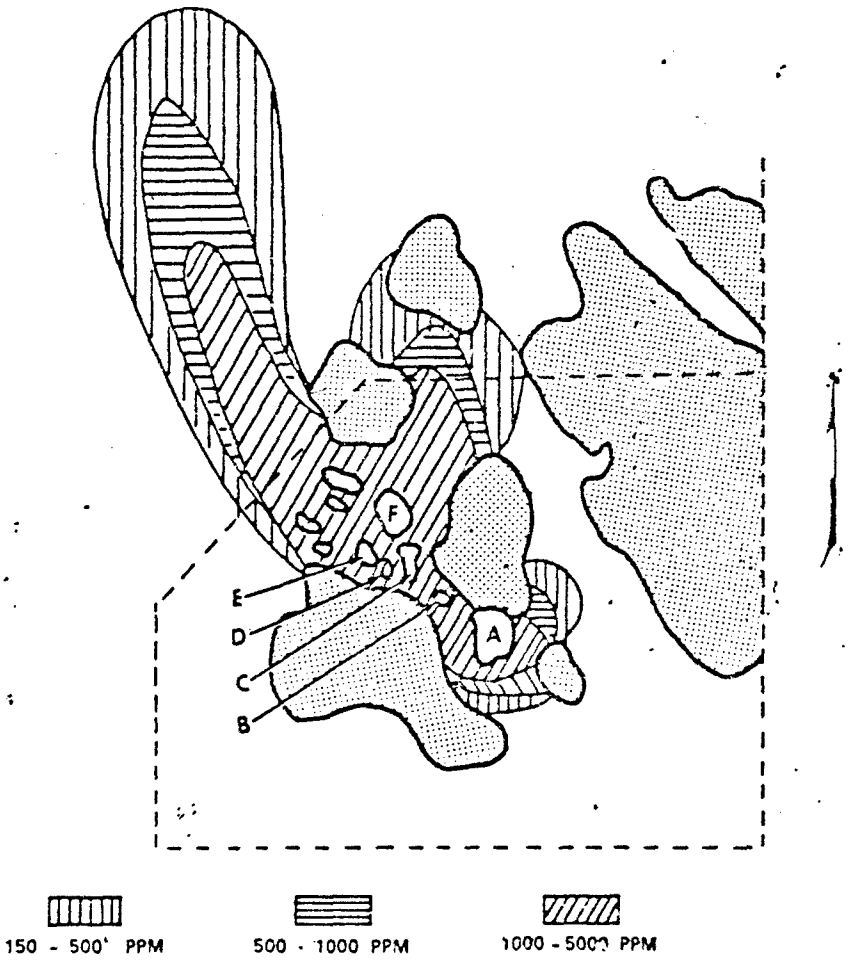

P
5230
5220
5210
5200
5190
5180
5170
5
6
7
LAND SURFACE
GROUND WATER TABLE
BEDROCK
ELEVATION ABOVE MEAN SEA LEVEL (FT)


P'
11
5230
8
9
10
5220
5210
5200
5190
5180
5170
CROSS SECTION P-P'
SCALE: HORZ: 1" = 100'
VERT: 1" = 10'
V. E. = 10X
FOR LOCATION SEE INCL 1


0
5220
5210
5200
5190
5180
5170
5160
ELEVATION ABOVE MEAN SEA LEVEL (FT)
4
3
2
1
7
LAND SU
GROUNI
WATER TA
BEDROCI


2
1
7
LAND SURFACE
1
2
GROUND
WATER TABLE
BEDROCK
CROSS SECTION 0 - 0'
SCALE: HORZ: 1" = 100'
VERT; 1" = 10'
V. E. = 10X
FOR LOCATION SEE INCL 1


0'
4
1
2
3
SURFACE
UND
TABLE
OCK
5220
5210
5200
5190
5180
5170
5160
ELEVATION ABOVE MEAN SEA LEVEL (FT)
CROSS SECTION 0 - 0'
SCALE: HORZ: 1" = 100'
VERT; 1" = 10'
V. E. = 10X
FOR LOCATION SEE INCL 1



OBSERVED AREA OF CHLORIDE CONTAMINATION IN 1956
(AFTER KONIKOW, 1975)

Incl 4